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**AEROSPACE MEDICINE
AND BIOLOGY**

**A CONTINUING BIBLIOGRAPHY
WITH INDEXES**

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

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In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis will be placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion. The contents of this issue are comprised of abstracts that were prepared by the three contributing organizations.

Each entry consists of a standard citation accompanied by its abstract. It is included in one of three groups of references that appear in the following order:

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Please refer to the accession number, e.g., A69-13193, when requesting documents. Address all inquiries and requests to

Technical Information Service
American Institute of Aeronautics and Astronautics, Inc.
750 Third Avenue, New York, N.Y. 10017

For further details please consult the *Introductions* to *STAR* and *IA-4*, respectively.

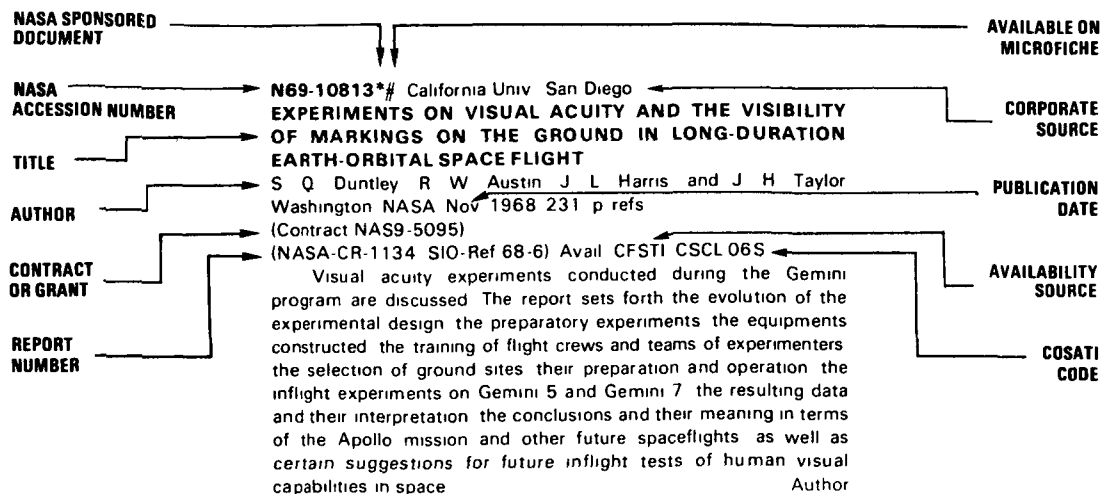
***LC* Entries**

Articles listed are available in the journals in which they appeared. They may be borrowed or consulted in libraries maintaining sets of these journals. In some instances, reprints may be available from the journal offices.

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TYPICAL CITATION AND ABSTRACT





AEROSPACE MEDICINE AND BIOLOGY

a continuing bibliography

MAY 1969

STAR ENTRIES

N69-17231# Technology Inc San Antonio Tex Life Sciences
Div
**EVALUATION OF THE STATE OF THE ART DEVICES FOR
THE BLIND**

Norma D Miller Jun 1968 20 p refs
(Contract PH-43-67-1437)
(PB-180246) Avail CFSTI CSCL 9A

The total solution of artificial vision with an external image device coupled into the visual pathway is not yet within our reach. A concentrated research and development program could probably produce the image capturing portion of the device within reasonable period of time. Basic research is still needed on the means of coding the translated image for introduction into the visual apparatus. Additional research is required to develop physiologically safe procedures for introducing the coded signals into the visual pathways. Some additional research and development effort in combining television systems with currently available optical aids would provide improved vision for many with visual handicaps. Such devices would be helpful to the partially sighted who have some measure of form discrimination remaining. The results of the effort would probably be most beneficial to the school age low vision group to broaden their opportunities for gainful occupations.

Author (USGRDR)

N69-17248*# National Aeronautics and Space Administration
Langley Research Center Langley Station, Va
**MITOTIC SYNCHRONIZATION OF L-STRAIN FIBROBLASTS
WITH 5-AMINOURACIL AS DETERMINED BY TIME-LAPSE
CINEPHOTOGRAPHY**

Clarence D Cone Jr and Max Tongier Jr Washington Feb
1969 28 p refs
(NASA-TN-D-5021) Avail CFSTI CSCL 06A

A technique for producing mitotically synchronous cultures of L-strain fibroblasts by treatment with 5-aminouracil (an analog of thymine) is presented along with a detailed description of a procedure for determining the resulting degree of synchrony by use of time-lapse cinephotography. Several sets of representative experimental results illustrating the mitotic synchronization effectiveness of 5-aminouracil as determined by the time-lapse

technique are presented and are interpreted on the basis of previous results for plant and animal cells. Basic effects on the validity of experimental results caused by deviations of synchronized experimental cultures from ideal or perfect synchrony are also discussed and a quantitative index for expressing the relative degree of synchrony attainable with various agents is defined. Author

N69-17250# Atomic Energy Commission Research Establishment
Riso (Denmark) Electronics Dept
**INSTRUCTION SYSTEMS AND ADMINISTRATIVE
PROCEDURES IN NUCLEAR REACTOR PLANTS**
Povel Timmermann 3 Oct 1968 7 p
(RISO-M-809) Avail CFSTI

Organization and instruction systems at power reactors are considered in relation to a total man-machine system. Emphasis is placed on the instruction of reactor operators in abnormal situations. Author (NSA)

N69-17321# NOLIT Publishing House Belgrade (Yugoslavia)
**EFFECT OF POSTIRRADIATION BLEEDING ON THE
PROLIFERATION OF BONE MARROW CELLS IN MICE
IRRADIATED WITH 350r. AUTORADIOGRAPHIC
EXAMINATION USING THYMIDINE-H-3**

Dobrila Karanovic et al. In its Bull. of the Boris Kidric Inst. of Nucl. Sci. Vol 17 No 1 1966 p 46-52 refs (See N69-17315 07-34)

Avail CFSTI

The effect of bleeding and postirradiation bleeding after 350r on the proliferation of erythroid myeloid and reticular cells in the bone marrow of mice is as follows: 1. In normal animals bleeding leads to increase of labelling activity of erythroid myeloid and reticular cells; the increase is much lower in reticular cells. 2. Postirradiation bleeding causes an earlier onset and peak of proliferation of erythroid cells in comparison with the behavior of proliferation of erythroid cells in mice only irradiated. 3. The application of the method of labelling cells (with thymidine-³H) in evaluating the proliferation of myeloid elements after irradiation must be accepted with suspicion at least if doses near semilethal are concerned because the stopping of mitotic activity causes the appearance of atypical cells labelled with marked intensity. 4. Effect of postirradiation bleeding on the proliferative activity of reticular cells is stimulative but spontaneous postirradiation regeneration indicated that it does not favor it. Author

N69-17322# NOLIT Publishing House Belgrade (Yugoslavia)
**INFLUENCE OF DNA ISOLATED FROM DIFFERENT
ORGANS ON THE REPARATION OF GERMINAL
EPITHELIUM AND MORPHOLOGICAL CHANGES OF
SPERMATOZOA OF TOTAL-BODY X-IRRADIATED RATS**

N. Savkovic et al. In its Bull. of the Boris Kidric Inst. of Nucl. Sci. Vol 17 No 1 1966 p 53-62 refs (See N69-17315 07-34)
Avail CFSTI

A study has been made of the effects of homologous liver thymus spleen testes brain and kidney DNAs on the reparation of germinal epithelium and morphological changes of spermatozoa of rats irradiated with a dose of 600r. The results shown that animals irradiated and treated with DNA from different organs show marked signs of reparation of spermatogenesis. They also show that DNA from different organs markedly decrease the number of morphologically abnormal spermatozoa. Author

**N69-17323# NOLIT Publishing House Belgrade (Yugoslavia)
EFFECTS OF ACTINOMYCIN-D ON THE INCORPORATION
OF 6-C-14-OROTIC ACID INTO THE RIBONUCLEIC ACID
FRACTIONS OF RESTING RAT LIVER**

Svetozar Petrovic et al. *In its Bull. of the Boris Kidric Inst. of Nucl. Sci.* Vol. 17, No. 1, 1966, p. 62-69, refs. (See N69-17315 07-34)

Avail. CFSTI

It has been established that actinomycin-D injected into adult rats produces a significant depression of RNA labelling in nuclear and cytoplasmic RNA fractions in resting rat liver. The data obtained show that s-RNA synthesis is depressed too. Author

**N69-17379# Yale Univ. New Haven Conn.
RETINAL FINE STRUCTURE AND VISUAL ORIENTATION
Final Research Report, 1 Jan -31 Dec 1967**

Talbot H. Waterman. Oct. 1968, 6 p, refs.

(Grants AF-AFOSR-1064-66, AF-AFOSR-1064-67)

(AD-678607, AFOSR-68-2336) Avail. CFSTI CSCL 6/3

The primary objective of this research project was to determine the sensory mechanism which permits many animals including various kinds of arthropods and cephalopods to orient themselves to the e-vector of natural polarized light in the sky and under water. Author (TAB)

N69-17395*# General Electric Co. Philadelphia Pa. Missile and Space Div.

**FROG EGG EXPERIMENTAL HARDWARE FOR APOLLO
APPLICATION PROGRAM PROTOTYPE PHASE Final Report**

22 Oct. 1968, 55 p.

(Contract NAS2-4641)

(NASA-CR-73298) Avail. CFSTI CSCL 06S

This report describes the work effort performed in the design and development of prototype hardware for a Frog Egg Experiment for the Apollo Applications Program. The purpose of the experiment is to determine the effects of zero gravity upon fertilization and germination of frog eggs; therefore this experiment requires fertilization of the eggs while in orbit under a zero gravity environment. The complete experiment package consists of four modules, each containing three biological units. Each biological unit consists of a series of chambers and valves that enable a complete cycle of growth from fertilization of the frog egg through germination and preservation at a desired stage of growth. During the contract period a breadboard unit and a prototype module were designed, fabricated and tested. The feasibility of providing experiment hardware to accomplish the desired function has been successfully demonstrated where acrylic is utilized for the chambers. Encouraging results have been achieved in using prototype glass chambers; however, breakage problems must be resolved before glass will be acceptable. Reasonable solutions to these problems are available for evaluation. Additional effort is needed in this area. Author

**N69-17477# Argonne National Lab. Ill.
BIOLOGICAL AND MEDICAL RESEARCH DIVISION Annual
Report, 1967**

Dec. 1967, 300 p, refs.

(Contract W-31-109-ENG-38)

(ANL-7409) Avail. CFSTI

Research activities are reported in the following areas of investigation: biophysical studies of molecular interactions; radiation effects on cultured cells and factors affecting radiosensitivity; analysis of radiation effects on cells at the biochemical level and the biosynthesis of macromolecules; biosynthesis and activity of enzymes in various pathways and the effects of ionizing radiation on these phenomena; preparation, detection, analysis and effects of radioisotopes in tracer studies; investigations of biochemical activities at the ultrastructural level in cells; effects of hormones on phototropic mechanisms in plants; gravity compensation studies in irradiated and nonirradiated plants; studies in mammalian genetics and the effects of radiation of genetic patterns; microbial and mutagenesis in microbial populations; radiobiological and biochemical studies of developmental phenomena among amphibians and insects; biochemical, biophysical and radiobiological studies of the mechanisms of carcinogenesis in organisms. NSA

**N69-17481# Aerospace Medical Div. Aerospace Medical
Research Labs (6570th) Wright-Patterson AFB, Ohio
LEGIBILITY OF SEGMENTED VERSUS STANDARD
NUMERALS THE INFLUENCE OF OBSERVER'S TASK**

Terrence K. Gibney. Aug. 1968, 29 p, refs.

(AD-679528, AMRL-TR-68-124) Avail. CFSTI CSCL 5/5

In many current visual display techniques numerals are formed by a pattern of individually illuminated segments. Laboratory research has indicated generally that such segmented numerals are not so easy to read as standard Arabic numerals. Research results suggest that in some practical complex tasks these laboratory differences disappear. In this series complexity of the observers' task and his freedom to control his viewing were systematically varied. As task complexity or allowable viewing time, or both increased, measured legibility differences between segmented and Arabic numerals tended to disappear. Author (TAB)

**N69-17482# Aerospace Medical Div. Aerospace Medical
Research Labs (6570th) Wright-Patterson AFB, Ohio**

**EVALUATION OF A COLORIMETRIC PERSONAL
DOSIMETER FOR HYDRAZINE FUELS Final Report, Aug -Dec
1967**

Eugene L. Arnold and Robert F. Rakowski. Oct. 1968, 29 p, refs.

(AD-679527, AMRL-TR-68-15) Avail. CFSTI CSCL 6/20

An evaluation of the performance of the colorimetric personal dosimeter for hydrazine fuels was conducted. The dosimeter reagent is an acid-base indicator. Volatile bases give false positive results, and acids decrease the sensitivity of the strips to hydrazines. The useful shelf life of unopened dosimeter packets is greater than 1 year. Variations in sensitivity were observed for different lots of dosimeter strips. This problem may be corrected by proper quality control. The majority of the strips were more sensitive than indicated by the manufacturers' calibration. Variation in the concentration and time of exposure at a constant CT product had little effect on the darkness of the strip but considerable effect on the hue. Strips placed in a closed cabinet for 8 hours developed a slightly red color. The badge is useful primarily as a check on the continued safety of areas which have been surveyed by a qualified bioenvironmental engineer. The badge cannot be relied on to give a useful estimate of the dose received in the case of a gross overexposure. The badge is a sensitive detector for hydrazine fuels. No great dependence should be placed on the quantitative interpretation of the colors developed. Author (TAB)

N69-17523 Washington Univ Seattle
KINETICS OF PROTON TRANSFER IN AMINO ACIDS AND PEPTIDES

Kenneth Roy Applegate (Ph D Thesis) 1967 102 p
 Avail Univ Microfilms HC \$5 20/Microfilm \$3 00 Order No 68-9259

Ultrasonic absorption measurements have been made in basic solutions of the amino acids glycine β -alanine γ -aminobutyric acid L-aspartic acid, L-glutamic acid and of the peptides diglycine and triglycine over the frequency range from 3.5 to 85 Mc/sec and over the pH range from 9 to 13. The frequency dependence of the absorption can be explained in terms of a single relaxation process with relaxation frequencies ranging from 5.05 Mc/sec for triglycine to 56.33 Mc/sec for γ -aminobutyric acid. The associated volume change for the process lies between 18 and 38 cc/mole. The variation of attenuation with pH exhibits a characteristic maximum within the range of study for each compound. The preceding results are consistent with a rate process in which a proton is transferred between the amino group and a water molecule.

Dissert Abstr

N69-17571# Aerospace Medical Div., Aerospace Medical Research Labs (6570th) Wright-Patterson AFB Ohio
RANDOM SHAPE RECOGNITION AT BRIEF EXPOSURE DURATIONS Final Report

Herbert J Clark Aug 1968 16 p refs
 (AD-679529 AMRL-TR-68-125) Avail CFSTI CSCL 5/10

Two groups of subjects were tested in a forced-choice recognition test for memory of 20 random shapes having two levels of complexity and two levels of association value. One group of 23 subjects viewed each shape for 0.25 sec, and the other group of 23 subjects viewed each shape for 0.50 sec. Fewer errors of recognition were made for shapes of high association value than for shapes of low association value while the effects of complexity and exposure duration were statistically insignificant. Consideration of the characteristics of the distractor shapes paired with the observed shapes during the forced-choice recognition test suggested that they may also have influenced recognition accuracy.

Author (TAB)

N69-17590# New York Univ., N.Y. Dept of Industrial Engineering and Operations Research
SEQUENTIAL INFORMATION PROCESSING IN MAN Final Technical Report, 1 May 1967-31 Dec 1968

Mark S Mayzner Dec 1968 7 p refs
 (Contract N00014-67-A-0467-0001)
 (AD-679913) Avail CFSTI CSCL 5/10

A program of research has been pursued which was directed at a systematic examination of several display parameters and their effects on visual information processing in man employing a computer-based cathode-ray tube (CRT) display system.

Author (TAB)

N69-17591# George Washington Univ Alexandria Va Human Resources Research Office
SUPPLEMENTARY FEEDBACK AN EXPLANATION AND EXPERIMENTAL TEST

Elmo E Miller, Richard W Sheldon and John F Bjorklund Nov 1968 20 p refs
 (Contract DA-44-188-ORO-2)
 (AD-679919 HumPRO-TR-68-13) Avail CFSTI CSCL 5/10

An experiment using the pursuit rotor apparatus tested two hypotheses: (a) supplementary feedback aids learning when it provides information by which to distinguish long target contacts from

short ones; (b) supplementary feedback especially if immediate facilitates performance by providing secondary reinforcement. Five groups of 20 subjects each were given 60 trials with the criterion interval adjusted for every trial to reinforce a particular proportion of target contacts for each group.

Author (TAB)

N69-17603# Atomic Energy Establishment Winfrith (England)
READING EQUIPMENT FOR THERMOLUMINESCENT DOSIMETRY

K E G Perry Jul 1968 15 p refs
 (AEEW-R-607) Avail CFSTI UK 2s 6d

A thermoluminescent reader used routinely for the measurement of finger tip doses is described. It covers a wide range of dose measurement and employs mainly commercially available electronic units in modular form. A more recent design of the measuring head which is still under development is suitable for use with solid forms of disc dosimeters as well as with loose LiF powder.

NSA

N69-17608# Melpar Inc Falls Church Va
SYNTHETIC FLIGHT TRAINING SYSTEM AH-56/CH-47, CONCEPT FORMULATION REPORT (ADDENDUM)

Franklin E Young and Eugene R Hall Orlando Fla Naval Training Device Center Sep 1968 72 p ref
 (Contract N61339-68-C-0107)
 (AD-678651 NAVTRADEVEN-68-C-0107-2, REPT-7596) Avail CFSTI CSCL 1/3

The report amends the Concept Formulation Report Synthetic Flight Training System (2824) to cover research and investigation into the technical and economic feasibility of operating one AH-56 cockpit and one CH-47 cockpit from the SFTS field unit computer/interface system. Computer storage timing and iteration rates, interface requirements and instructor functions are analyzed. Required modifications of the basic-design field unit to accommodate the CH-47A/AH-56 configuration are presented. Cost and scheduling are developed for expanding one of the eight basic-design field units to include all hardware and software required for the AH-56/CH-47 simulation. The cost effectiveness of the expanded unit is analyzed.

Author (TAB)

N69-17738*# Michigan Univ Ann Arbor
A FUNDAMENTAL STUDY OF PREDICTIVE DISPLAY SYSTEMS

John De Shon Warner Washington NASA Feb 1969 200 p refs
 (Contract NASr-54(06))
 (NASA-CR-1274) Avail CFSTI CSCL 05H

The particular predictive technique considered utilizes a repetitive fast time on-line computation scheme which provides a predicted response of the controlled element to the human operator based on certain assumptions about future control inputs and disturbances. An in-depth discussion is provided on the various characteristics that are important in any predictive display application. The problem of performance measurement is discussed. An experimental investigation on the effects of the controlled element dynamics on performance with three display forms (exploratory prediction on-line prediction and no prediction) in a time vs error format is reported. A minimum time terminal control task for a pure inertia system driven by a fixed three state relay controller was chosen for the study. The system is described by several independent parameters which are hypothesized as being important in a variety of manual control situations. These parameters

are varied systematically to determine their effect on performance with the three display forms. Several new performance measures are developed for use in minimum-time terminal control tasks.
Author

N69-17742# Armed Forces Radiobiology Research Inst Bethesda Md
VISUAL DISCRIMINATION PERFORMANCE IN THE MONKEY (MACACA MULATTA) A TECHNIQUE AND ASSESSMENT OF 5000 RADS GAMMA-NEUTRON IRRADIATION

H J deHaan and J E Gernas Jun 1968 33 p refs
(AD-679698 AFRRI-SR68-16) Avail CFSTI CSCL 6/18

A study was undertaken to assess the effects of radiation on visual discrimination performance in the monkey (*Macaca mulatta*). Six monkeys were trained to avoid shock by responding to one of two visual stimuli presented simultaneously. Each monkey was irradiated with approximately 5000 rads of gamma-neutron radiation delivered in a millisecond-range pulse. Behavioral data were obtained from 1/2 hour prior to the pulse and for 2-1/2 hours afterwards (Phase 1). Thereafter, behavioral data were obtained every 4 hours from pulse time (Phase 2). Temporary decrements in visual discrimination performance occurred in five out of six monkeys after exposure (median interval = 2 minutes 10 seconds). The duration of the decrement varied between 7-1/2 minutes and 2-1/2 hours (the duration of Phase 1). All monkeys were able to perform visual discriminations at some time after irradiation. Maximum postirradiation performance during Phase 2 sessions occurred on the average at 8 hours postpulse, but ranged from 4 to 20 hours. Survival time varied from approximately 12-1/2 hours to 51-1/2 hours. Vomiting occurred in five out of six animals but did not appear to interfere with effective performance. The results demonstrated a marked variability in the monkeys response to radiation in both performance and survival time. Author (TAB)

N69-17764# Case Western Reserve Univ Cleveland Ohio Dept of Radiology
DEPARTMENT OF RADIOLOGY Annual Report for Period Ending 30 Apr 1968

Hymer L Friedell 1 May 1968 179 p refs
(Contract W-31-109-ENG-78)
(COO-78-174) Avail CFSTI

The results and status of research in the Department of Radiology at Case-Western Reserve University are reported. For convenience, the reports are submitted in the following sections: radiation physics, radiation cytology, radiation biochemistry, radiation modifiers, and radiation physiology. A list of publications and reports originating in the department is included as well as a list of the meetings attended and papers presented. NSA

N69-17777*# Chicago Univ Ill Dept of Biophysics
INVESTIGATIONS IN SPACE-RELATED MOLECULAR BIOLOGY INCLUDING CONSIDERATIONS OF THE MOLECULAR ORGANIZATION IN LUSTER SOUNDING ROCKET PROGRAM Semiannual Progress Report, 1 May-31 Oct 1968

Humberto Fernandez-Moran 31 Oct 1968 41 p refs
(Grant NGL-14-001-012)
(NASA-CR-73888) Avail CFSTI CSCL 06A

Submicron particles obtained during rocket sounding experiments are being analyzed by electron micrographs for their extraterrestrial origin. The newly developed 200 kV electron microscope achieves resolutions of 3.6 Å to 6 Å in crystalline lattices

and of about 4 Å point-to-point resolutions in thick biological specimens (about 250 Å to 350 Å). A closed cycle liquid helium refrigeration system is used in connection with the described electron microscope for low temperature work on ultra structures of biological systems. Developments are also reported in instrumentation and preparation techniques for high resolution cryogenic electron microscopy publications and supporting materials from the period May 1 through October 31 1968 are included. GG

N69-17782*# National Aeronautics and Space Administration Langley Research Center Langley Station Va
OSMOTICALLY INDUCED COALESCENCE OF SARCOMA CELLS THROUGH INTERCELLULAR BRIDGES IN VITRO

Clarence D Cone Jr and Max Tongier Jr Washington Feb 1969 24 p refs
(NASA-TN-D-5022) Avail CFSTI CSCL 06R

A relatively detailed description is presented of a microtechnique by which cells possessing true intercellular bridges *in vitro* can be induced to coalesce into single mono- and multinucleate giant cells. The technique consists in the carefully controlled perfusion of a cell field with a hypotonic solution which causes osmotic swelling and thereby induces connected cells to coalesce through expansion of the connecting bridge. Details of the perfusion system and methodology are discussed along with the system of time lapse cinemicrography used for recording the coalescence process. Principal features of an alternate coalescence technique utilizing a movable micropipet are also outlined. Representative photographic sequences reproduced from time lapse film recordings are presented to illustrate the basic nature of the coalescence phenomenon for the case of L-strain fibroblasts. An interpretation of the implications of coalescence in indicating cytoplasmic continuity of intercellular bridges and other aspects of intercellular communication at the molecular level is included. Finally a brief mention is made of several additional cytological applications of the osmotic swelling procedure. Author

N69-17814*# National Aeronautics and Space Administration Flight Research Center Edwards Calif

HUMAN TRANSFER CHARACTERISTICS IN FLIGHT AND GROUND SIMULATION FOR A ROLL TRACKING TASK
Fred D Newell (Cornell Aeron Lab Inc) and Harriet J Smith
(NASA-TN-D-5007) Avail CFSTI CSCL 05H

Pilot transfer characteristics for three pilots were measured in flight and in ground based simulators for a compensatory roll tracking task with small bank angle disturbances. The forcing function in each case consisted of the sum of ten sine waves with a bandwidth of 1.5 radians per second. A variable stability T-33 airplane was used to obtain the flight measurements. Ground based simulator measurements were obtained with both the T-33 airplane and a general purpose simulator which used a contact analog color display. Three different controlled elements were used two of which were simple single degree of freedom controlled elements that were studied previously. The third was a multiple degree of freedom element representative of an airplane with good handling qualities and was considered and controlled as a single degree of freedom configuration in roll. The results of the simple controlled element experiments agreed reasonably well with previous results. For the multiple degree of freedom controlled element experiment a noticeable effect of display was found. For this experiment which was restricted to a small disturbance bank angle tracking task with good controlled element dynamics nonvisual motion cues appeared to be of less importance than visual cues. Author

N69-17849# P E C Research Associates Inc Louisville Ky
LOGIC OF DISCOVERY Final Report, 10 Jan 1966-30 Jul 1968

Michael Scriven Jul 1968 67 p
 (Contract AF 49(638)-1672)

(AD-679605, AFOSR-68-2796) Avail CFSTI CSCL 5/6

This report summarizes some of the reconceptualizations of the task of philosophy of science. It attempts to demonstrate the value of bringing elements from the field of discovery into the analysis of the basic concepts of completed science and the enrichment resulting from unification of subjective and objective elements in science. The report contends that there is a set of teachable procedures that can be described as the logic of science that can increase the efficiency of scientific practice and accelerate the teaching of scientific methods. The reconceptualizations are particularly relevant to research designs and strategies and to the field of computer simulation of machines having human intelligence capabilities. Author (TAB)

N69-17913 Brandeis Univ Waltham Mass
CONSTRUCT AND FIGURE INTEGRATIONS WITHIN A PERSONAL CONSTRUCT SYSTEM AN EXTENSION OF REPERTORY GRID TECHNIQUE

Jack R Adams-Webber (Ph D Thesis) 1968 108 p

Avail Univ Microfilms HC \$5 40/Microfilm \$3 00 Order No 68-9925

The primary concern of this study was the analysis of the ways in which structural characteristics of an individual's personal construct system influence his social judgments and predictions. The methodological paradigm employed here was based on Kelly's Repertory Grid technique. The basic assumption of this research was that each individual evolves a system of interpersonal constructs to interpret and predict his own behavior and that of his associates. A series of related hypotheses were developed within the axiomatic framework of Personal Construct Theory and subjected to experimental test. These hypotheses concerned relationships between certain structural characteristics of an S's construct system and formal aspects of his inferences about a new acquaintance following a brief social interaction with him. Dissert Abstr

N69-17930# Air Force Systems Command Wright-Patterson AFB Ohio Foreign Technology Div
MAXIMAL OXYGEN CONSUMPTION AND THE FUNCTIONAL STATE OF THE CIRCULATORY SYSTEM FOLLOWING SIMULATED WEIGHTLESSNESS

V S Georgiyevskiy et al 29 Mar 1968 9 p Transl into ENGLISH of the book Simpozium Posvyashchennyi Izucheniyu Kislorodnogo Rezhima Organizma i Ego Regulirovaniya Kiev 1965 (AD-679504 FTD-HT-23-124-68) Avail CFSTI CSCL 6/16

The effects of simulated weightlessness on oxygen consumption and the functional state of the cardiovascular system were studied in four healthy male subjects aged 22-25 yrs. Weightlessness was simulated by 20 days of rigorous bed rest (the horizontal position of the body during bed rest creating a hydrostatic pressure distribution similar to that produced by the absence of gravity). Motor activity was kept to a minimum; the subjects were aided in feeding and toilet functions by nursing personnel, and passed the time in reading, chatting, and watching TV. Before and after bed rest the subjects underwent progressive physical-loading tests consisting of work of increasing difficulty on a veloergometer. Endurance limits were considered reached when the subjects were unable to continue and when O₂ consumption and pulse rates reached high levels. The amount of work performed during the test, O₂ consumption and CO₂ excretion, phonocardiograms, carotid sphygmograms, and EKGs were recorded. Author (TAB)

N69-17941* TRW Systems Redondo Beach Calif
 Thermophysics Section Lab
MEASUREMENTS REPORT THERMAL PROPERTY MEASUREMENTS OF MANNED SPACECRAFT CENTER SPACESUIT MATERIALS

16 Dec 1968 4 p refs

(Contract NAS9-3670)

(NASA-CR-92480 TRW-68-3346 11ja-102) Avail CFSTI CSCL 06K

The near normal solar reflectance and transmittance of polysulfane (with a LEV 32 coating on the rear surface) have been measured by integrating sphere reflectometer. Simultaneous reflectance and transmittance measurements were integrated over the Johnson solar energy spectrum. Transmittance was measured next integrated over the Johnson solar energy spectrum and then subtracted from the combined reflectance/transmittance to yield solar reflectance data of 0.14₅ for the above described material. G G

N69-18014# Aeronautical Research Labs Melbourne (Australia)
PADDING MATERIALS FOR HEAD IMPACT PROTECTION

S R Sarraillhe Jul 1968 35 p refs

(ARL/SM-321) Avail CFSTI

Data on the tolerance of the head to impact are reviewed and design forces for padding suggested. The effects of padding thickness and material properties are discussed and ways of selecting materials are indicated. Results of tests on materials available in Australia are discussed. Author

N69-18046# Sandia Corp Albuquerque N Mex Planetary Quarantine Dept

PLANETARY QUARANTINE PROGRAM Quarterly Report for Period Ending 31 Dec 1968

Dec 1968 23 p

(NASA Orders R-09-019-040 H-13245A)

(NASA-CR-99345, QR-11) Avail CFSTI CSCL 06B

Information on clean packaging materials was reviewed and assembled into standard handbook format. Models for estimating spacecraft bioburdens were developed for use in areas associated with manned lunar missions. A recirculating downflow unit was developed and tested for wash efficiency with aluminum oxide particles. Possible effects of lunar contamination by terrestrial organisms from Apollo systems impacting on lunar surface were estimated as well as the likelihood of retrieving any organism during the following Apollo mission. Sterilization modeling and support experimentation for generating bioengineering parameters of planetary quarantine sterilization continued. Based upon model predictions, heating at reduced levels for five to ten days evolved as effective spacecraft sterilization method. G G

N69-18085*# Lovelace Foundation for Medical Education and Research Albuquerque N Mex Dept of Aerospace Medicine and Bioastronautics

REVIEW OF PHYSIOLOGICAL MEASUREMENT TECHNIQUES FOR APPLICABILITY TO SPACE FLIGHT CONDITIONS

T M Fraser Washington NASA Feb 1969 256 p refs

(Contract NASr-115)

(NASA-CR-1277) Avail CFSTI CSCL 06B

Techniques in the fields of cardiovascular and respiratory function are examined and approaches to anthropometric and body composition are discussed with a view toward those techniques which might be most useful in work to be performed in a manned space laboratory. Rather than claiming to be a comprehensive physiological review, this study emphasizes areas where the information to be gained is significant but where techniques available do not readily lend themselves to use in space or where a multitude of available techniques requires consideration. K W

N69-18131*# Harding Coll Searcy Ark
METHODS OF ACHIEVING AND MAINTAINING PHYSICAL FITNESS FOR PROLONGED SPACE FLIGHT Progress Report, 1 Jan 31 May 1968

Henry D Olree Jul 1968 27 p refs

(Grant NGR-04-002-004)

(NASA-CR-99346) Avail CFSTI CSCL 06N

Tests were conducted to determine which of three variable length training sessions 20 40 or 60 minutes per day would produce the greatest gain in physical fitness. The subjects were 20 male college students average age 21 37 years who had below average maximal oxygen uptake values. Baselines were determined on biochemical and physiological parameters by administering the following (1) a medical examination (2) a lean body mass determination (3) an American Association for Health Physical Education and Recreation battery test (4) a treadmill test (5) a bicycle ergometer test (6) an orthostatic tolerance test. Fifty-two variables were considered as indexes of physical fitness. The subjects who exercised 60 minutes per day made greater gains on specified component of physical fitness than those in the other two groups. K W

N69-18168 Columbia Univ New York
PARAMETERS OF VISUAL BAND MOVEMENT

Vivianne Cameron Smith (Ph D Thesis) 1967 82 p

Avail Univ Microfilms HC \$4 40/Microfilm \$3 00 Order No 67-15522

The velocity at which a light rotated in a fronto-parallel plane around a foveal fixation target appears as a filled band of light rather than a moving luminous object was determined with parametric manipulation of (a) eccentricity of the moving target (b) arc length traversed (c) luminance and wavelength composition of the target and (d) visual angle subtended by the target. The velocity of threshold increases as the luminance area and arc length increase. It is also possible to calculate for each arc length, the time that the moving light remains in the field at threshold velocity. The form of the time-luminance function depends on the retinal locus the photopic or scotopic mechanism dominating the response and on the arc length. Dissert Abstr

N69-18220# Aktiebolaget Atomenergi Stockholm (Sweden)
ASPECTS OF LOW TEMPERATURE IRRADIATION IN NEUTRON ACTIVATION ANALYSIS

D Brune Aug 1968 14 p refs

(AE-332) Avail CFSTI

Neutron irradiation of the sample while frozen in a cooling device inserted in a reactor channel has been carried out in the analysis of iodine in aqueous samples as well as of mercury in biological tissue and water. For the simultaneous irradiation of a large number of aqueous solutions the samples were arranged in a suitable geometry in order to avoid mutual flux perturbation effects. The influence of the neutron temperature on the activation process has been discussed. Potential applications of the low temperature irradiation technique are outlined. Author (ESRO)

N69-18234# Rand Corp Santa Monica Calif
SOME COMMENTS ON THE CLOSED CIRCUIT TV SYSTEM FOR THE VISUALLY HANDICAPPED

Samuel M Genesky Dec 1968 17 p Presented at the Ann Meeting of the Am Acad of Optometry (48th) Beverly Hills Calif 10 Dec 1968

(AD-679526 P-3984) Avail CFSTI CSCL 17/2

The conventional definitions of blindness are discussed and the term visually handicapped is used to identify persons who have poor vision and have great difficulty reading and writing even with the aid of eyeglasses. The possibility is discussed of using closed circuit television to increase image magnification light intensity or brightness or some combination of these factors. Details are given on a prototype system and the method of operation. M G J

N69-18291# Massachusetts Inst of Tech Cambridge Fluid Mechanics Lab

PERISTALTIC PUMPING WITH LONG WAVE LENGTHS AT LOW REYNOLDS NUMBER Summary Report

Ascher H Shapiro Michel Y Jaffrin, and Steven L Weinberg Sep 1968 61 p refs

(Contract N00014-67-A-0204)

(AD-679180 Publ-68-5) Avail CFSTI CSCL 20/4

Pumping by means of an infinite train of peristaltic waves is investigated under conditions for which (1) the relevant Reynolds number is small enough for inertial effects to be negligible and (2) the wavelength-diameter ratio is large enough for the pressure to be considered uniform over the cross-section. Theoretical results are presented for both plane and axis-symmetric geometries, and for amplitude ratios ranging from zero to full occlusion. For a given amplitude ratio the theoretical pressure rise per wavelength decreases linearly with increasing time-mean flow. An experiment with a quasi-two-dimensional apparatus confirmed the theoretical values. Calculations of the detailed fluid motions reveal that under many conditions of operation the net time-mean flow is the algebraic difference between a forward time-mean flow in the core of the tube and a backward (reflux) time-mean flow near the periphery. The percentage of reflux flow can be very high. This reflux phenomenon is probably of physiologic significance in the functioning of the ureter and the gastro-intestinal system. A second fluid mechanical peculiarity with physiological implications is that of trapping under certain conditions an internally-circulating bolus of fluid lying about the axis, is transported with the wave speed as though it were trapped by the wave. Author (TAB)

N69-18292* Pennsylvania State Univ University Park Biophysics Dept

PHYSICS OF CELLULAR SYNTHESIS, GROWTH AND DIVISION Status Report, 1 Jul -31 Dec 1968

E C Pollard Jan 1969 16 p refs

(Grant NGR-39-009-008)

(NASA-CR-99768) Avail CFSTI CSCL 06P

Results of continuing research are reported. Topics include (1) bacteriophage studies in filamentous cells, (2) investigations of the structure of ribosomes of chromatoid bodies, (3) analysis of the functions of nonsense codons those code words in the genetic code which do not specify amino acids and have been shown to cause termination of polypeptide synthesis, (4) studies of temperature effects on phage T4 and pressure effects on ribosomes and enzymes, (5) equipment and techniques for investigating the biochemistry of learning and memory, (6) tests on effects of high sugar concentrations of *E coli*, (7) electromicroscopic and microspectrophotometric studies of cells, (8) observations of nerve-muscle relationships in insects, (9) radiobiological studies of an aqueous DNA solution, and (10) mammalian cell research, as related to modification of radiation effects and properties of cultured cell surfaces as well as ultraviolet techniques in photobiology. Publications released during the reporting period are listed. A C R

N69-18293* Naval Aerospace Medical Inst Pensacola Fla Medical Center
RESEARCH ON THE EFFECTS OF VERY STRONG MAGNETIC FIELDS AND OF MAGNETIC FIELD-FREE ENVIRONMENTS ON MAN AND ANIMALS Progress Report, 1 Nov 1968-31 Jan 1969

D E Beischer 31 Jan 1969 4 p refs

(NASA Order R-39)

(NASA-CR-99767) Avail CFSTI CSCLO6S

Results of continuing research are discussed in studying the biological effects of strong magnetic fields the following topics are summarized (1) performance tests on a superconducting magnet for use in electrophysiological research, (2) improved measurement techniques for determining nerve excitability (3) effects of magnetic field strength on enzyme reactions and (4) behavior of primates in high magnetic environments, in this case using a chimpanzee Preparations are in progress for research into the effects of completely magnetic free environments on human subjects The status of reports and a list of publications released during the reporting period are provided ACR

N69-18312# Atomic Energy Commission Washington, D C Div of Technical Information

RADIOBIOLOGY, VOLUME 7, NUMBER 5

1967 284 p refs Transl into ENGLISH from Radiobiologiya (Moscow) v 7 no 5 1968 p 643-815

(AEC-tr-6954-Vol-7-No-5) Avail CFSTI

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14 RADIOECOLOGICAL INVESTIGATIONS IN SEAS AND OCEANS G G Polikarpov p 262-279 refs (See N69-18326 08-04)

N69-18313# Atomic Energy Commission, Washington D C Div of Technical Information

DEVELOPMENT OF RADIOBIOLOGY IN THE USSR DURING THE FIFTY YEARS OF SOVIET POWER

A M Kuzin *In its Radiobiol* Vol 7 No 5 1967 p 1-22 refs (See N69-18312 08-04)

Avail CFSTI

A history of the development of radiobiology in the USSR is presented Stages in the advancement are (1) mutagenic effects of cosmic rays and the accumulation of radioactive substances in plants and animals, (2) use of X-rays and radium treatment in medicine (3) establishment of isotope and radiation studies in the academy of Sciences (4) genetic effects of radiation and (5) radiation immunology FOS

N69-18314# Atomic Energy Commission Washington D C Div of Technical Information

INFLUENCE OF IONIZING RADIATION ON THE MACROMOLECULAR ORGANIZATION OF DNA AND DNP

P I Tseitlin et al *In its Radiobiol*, Vol 7, No 5 1967 p 23-41 refs (See N69-18312 08-04)

Avail CFSTI

The article surveys in detail the conclusions drawn from investigations of the effect of ionizing radiation on DNA and DNP in recent decades by various investigators and presents the results of numerous experiments on various aspects (1) comparison of the radiosensitivity of dry DNA and DNA irradiated in organs under conditions where the influence of metabolic processes and direct influence on the radiosensitivity of the DNA were excluded (2) study of dispersion of the optical rotation of DNA (3) study of the variation in optical activity of DNA as a function of the percentage of protein (4) comparison of the specific rotation of DNA DNP and histone as a function of temperature, and (5) study of curves of the dispersion of optical rotation of DNP concentrations of salts leading to dissociation of the complex Author

N69-18315# Atomic Energy Commission Washington D C Div of Technical Information

ON THE PRIMARY PHYSIOCHEMICAL MECHANISMS OF RADIATION INJURY

B N Tarusov *In its Radiobiol* Vol 7 No 5 1967 p 42-55 refs (See N69-18312 08-04)

Avail CFSTI

The mechanisms of oxidative reactions occurring in irradiated cells is studied Lipids have been found to be the most radiochemically oxidizable cell substrate and under the effect of radiation a nonstationary chain reaction develops which destroys the structural lipids The EPR method has been used to study ultraweak luminosity in the blue-green region of the spectrum of all viable cells

of animals and plants resulting from ketone formation through recombination of peroxide radicals during oxidation of hydrocarbons and lipids
Author

N69-18316# Atomic Energy Commission Washington D C
Div of Technical Information

ANALYSIS OF MODERN CONCEPTS OF THE PHYSICO-CHEMICAL MECHANISMS OF THE PARTICIPATION OF OXYGEN IN RADIATION INJURY

L Kh Eidus *In its Radiobiol* Vol 7, No 5 1967 p 56-73
refs (See N69-18312 08-04)

Avail CFSTI

Based on a literature survey, it is concluded that the modifying influence of oxygen is connected with its action on radiation products with saturated valences, such as water or impurity radicals or ionized macromolecules with latent damage one sign of which is long stability with unpaired electrons. The physical mechanisms by which the oxygen effect is accomplished are still not clear. Analogies of the effects of oxygen and nitric oxide indicate that the influence of oxygen is conditioned by the paramagnetism of molecules of gases which represent radicals in the fundamental unexcited state which is correlated to the fact that they interact only with radical states of molecules
Author

N69-18317# Atomic Energy Commission Washington D C
Div of Technical Information

BIOCHEMICAL MECHANISMS OF THE ACTION OF RADIOPROTECTORS

E F Romantsev *In its Radiobiol* Vol 7 No 5 1967 p 74-88
refs (See N69-18312 08-04)

Avail CFSTI

A survey of reported work on the biochemical mechanisms of radioprotector action is presented. Hypotheses about the mechanism are based on the fact of variation of cell radiosensitivity possibly by hundreds of times depending on the physical state of the cell, through biochemical mechanisms. Older animals are more radioresistant than young, and cold-blooded more radioresistant than warm-blooded. Cells in different phases of the life cycle vary in sensitivity and therefore radio-sensitivity can be influenced by temporarily retarding the life cycles with certain chemical agents. Information obtained about the action of vitamins P, C, B₁, B₆ and B₁₂ of β -mercaptoethylamine, MEA, L-cysteine, AET and other protectors is presented and analyzed
Author

N69-18318# Atomic Energy Commission Washington D C
Div of Technical Information

RADIATION DISRUPTIONS OF GENETIC INFORMATION IN THE CELL

M I Shal'Nov et al *In its Radiobiol*, Vol 7, No 5 1967 p 89-116 refs (See N69-18312 08-04)

Avail CFSTI

Damages of nitrogenous bases of nucleic acids which change the meaning of genetic information have been studied on simple models with two types of radiolytic reactions: those accompanied by change in the ring structures (losses) and those taking place in the added group (modifications). The type of individual radiosensitivity of bases in quantum chemistry is explained by energy and structural characteristics of the molecular orbits which determine the ability of the bases to add free radicals. Schemes of the substitution of amino acids in polypeptides synthesized under the control of mutated genes are presented. The prevention of genetic damages has been studied by the prophylactic treatment of microbial cells with iodoacetamide before irradiation which sensitizes them toward irradiation and the prophylactic administration of amino acids to mice
Author

N69-18319# Atomic Energy Commission, Washington D C
Div of Technical Information

ON THE ROLE OF SULFHYDRYL GROUPS IN THE DETERMINATION OF NATURAL RADIOSENSITIVITY AND ITS ARTIFICIAL VARIATION

E Ya Graevskii *In its Radiobiol* Vol 7, No 5 1967 p 117-137
refs (See N69-18312 08-04)

Avail CFSTI

Radiosensitivity increases with complication of structure but its main features can be considered a cellular problem, with DNA the principal target of the effect of ionizing radiation. Accumulated data indicate that the sulfhydryl groups can be a common basis of natural and artificial radiosensitivity that their level in the cell can determine its radiosensitivity. This responsibility of the sulfhydryl groups has not been proven and it has been suggested that their effect is not due to their participation in the act of protection but to changes they cause in the biological object: possible increased activity of enzymes which shift the thiol-disulfide equilibrium in the direction of increase of SH-groups in the cell
Author

N69-18320# Atomic Energy Commission Washington D C
Div of Technical Information

RECOVERY OF CELLS FROM INJURIES INDUCED BY IONIZING RADIATIONS. SOME COMPARATIVE ASPECTS

V I Korogodin *In its Radiobiol* Vol 7 No 5 1967 p 138-161
refs (See N69-18312 08-04)

Avail CFSTI

Comparisons of various manifestations of postirradiation recovery of cells, and a discussion of the mechanisms of viability recovery by irradiated cells are presented. Criticisms of the target theory and proposals for solving the problem of the role which the repair processes manifested in recovery of cells from radiation injuries are included
Author

N69-18321# Atomic Energy Commission Washington D C
Div of Technical Information

THE PROBLEM OF POSTRADIATION RECOVERY IN THE LIGHT OF THE THEORY OF RADIOTOXINS

A M Kuzin *In its Radiobiol* Vol 7, No 5 1967 p 162-173
refs (See N69-18312 08-04)

Avail CFSTI

A survey of the literature dealing with the paths of formation of radiotoxins under the effect of distant γ or X irradiation, their role in radiation damage of the cell and the mechanisms of postirradiation recovery is presented. The path of recovery in which the postirradiation reduction of effect consists in halting the reactions leading to the accumulation of radiotoxins is emphasized. In studies of plant seeds it was found that a decisive stage in damage of cells is interaction of radiotoxins with the DNA of the nucleus and that damage can be reduced by washing the radiotoxins from injured tissues with two percent urea solution. The same method has been successfully used on frogs. In seeking new ways to reduce post-irradiation damage, methods directed toward reducing the level of radiotoxins in the irradiated organism cannot be disregarded
Author

N69-18322# Atomic Energy Commission Washington, D C
Div of Technical Information

ON THE PECULIARITIES OF RADIATION SICKNESS IN THE CASE OF PARTIAL OR NONUNIFORM IRRADIATION OF THE ORGANISM AND THE POSSIBILITIES OF USING AUTOTRANSPLANTATION OF BONE MARROW UNDER THESE CONDITIONS

G S Strelin *In its Radiobiol.* Vol 7 No 5 1967 p 174-198
 refs (See N69-18312 08-04)
 Avail CFSTI

A survey of the literature is presented on experiments and observations of the importance of screening part of the bone marrow and irregular irradiation in mice rats and monkeys. Consideration is given to screening and transplantation in invertebrates the effects of irradiation through grids and the recovery of various tissues after radiation damage in connection with their regenerative activity. It has been found in experiments through grids and with autotransplantation of unirradiated parts of the bone marrow that the unirradiated tissues stimulate homopoiesis suppressed by irradiation. Author

N69-18323# Atomic Energy Commission Washington, D C
 Div of Technical Information
TRANSPLANTATION OF CELLS TO IRRADIATED RECIPIENTS—A MODEL OF BIOLOGICAL INVESTIGATIONS
 R V Petrov *In its Radiobiol.* Vol 7 No 5 1967 p 199-222
 refs (See N69-18312 08-04)
 Avail CFSTI

A survey of the literature on the subject use of irradiated animals as test tubes (cultivation in vivo). This consists of obtaining cells from a donor transplanting them in a lethally irradiated recipient, and estimating the vital activity in the recipient. It permits studying the direct action of different types and doses of radiation and radioprotectors. Radiation-induced inactivation of antibody formation has also been investigated. The purpose of the article was to attract the attention of investigators to a promising method which has developed. Author

N69-18324# Atomic Energy Commission Washington, D C
 Div of Technical Information
THE PROBLEM OF THE NEURORADIOEMBRYOLOGICAL EFFECT
 I A Piontkovskii *In its Radiobiol.* Vol 7 No 5 1967
 p 223-237 refs (See N69-18312 08-04)
 Avail CFSTI

A survey of literature on the effect of irradiation of pregnant women for therapeutic or diagnostic purposes on the central nervous system of the embryo or fetus (neuroradioembryological effect (NREE)). Intrauterine manifestations of NREE have been studied inadequately from morphological aspects considerably less from the genetic, biochemical and physiological. Postnatal manifestations of NREE can be quite varied and appear primarily as macroscopically visible congenital disorders of the brain structure but often there are anomalies of brain development which are revealed only by detailed investigations of behavior, conditioned-reflex activity and electro-physiological indicators. Author

N69-18325# Atomic Energy Commission, Washington D C
 Div of Technical Information
ON THE CAUSES OF THE DISAGREEMENTS IN EVALUATING THE RADIOSENSITIVITY OF THE CENTRAL NERVOUS SYSTEM AMONG RESEARCHERS USING CONDITIONED REFLEX AND MAZE METHODS
 N N Livshits *In its Radiobiol.* Vol 7 No 5 1967 p 238-261
 refs (See N69-18312 08-04)
 Avail CFSTI

A survey of the literature on the determination of radiosensitivity in rats by conditioned reflex and labyrinth methods

is presented. The differences are explained by peculiarities of the methods and not by errors in the investigation. Disturbance of labyrinth activity is more readily compensated than that of conditioned reflex activity because, in a labyrinth an animal can use information arriving simultaneously through various afferent systems and there are many afferent organs for response reaction. This is of great importance in radiation pathology where focal disturbances of neuron functions are diffuse. Author

N69-18326# Atomic Energy Commission Washington D C
 Div of Technical Information
RADIOECOLOGICAL INVESTIGATIONS IN SEAS AND OCEANS

G G Polikarpov *In its Radiobiol.* Vol 7 No 5 1967 p 262-279
 refs (See N69-18312 08-04)
 Avail CFSTI

A report is presented on recent activity in radioecological studies in seas and oceans as reflected in the proceedings of recent symposia and congresses. Author

N69-18331# Atomic Energy Commission Washington D C
 Div of Technical Information
RADIOBIOLOGY, VOLUME 8, NUMBER 1
 1968 322 p refs Transl into ENGLISH from Radiobiologiya (Moscow) v 8 no 1, 1968 p 1-306
 (NEC-tr-6950-Vol-8-No-1) Avail CFSTI

The articles presented pertain to radiation effects tolerances and damages in plants and animals and the efficacy of antiradiation drugs. For individual titles see N69-18332 through N69-18366

N69-18332# Atomic Energy Commission Washington D C
 Div of Technical Information
THE RADIATION-CHEMICAL PROPERTIES OF DNA
 V A Sharpatyi et al *In its Radiobiol.* Vol 8 No 1 1968 p 1-8
 refs (See N69-18331 08-04)
 Avail CFSTI

The yields of radicals obtained in the irradiation of 0.2% frozen and liquid aqueous solutions of DNA and dry preparations were determined by the EPR method. It was found that the yields resulting from the indirect action of radiation (in liquid solutions) are larger by one order of magnitude than those from the direct action (in frozen solutions and dry samples). Author

N69-18333# Atomic Energy Commission Washington D C
 Div of Technical Information
RELATIVE RADIOSENSITIVITY OF THE SYNTHESIS OF NUCLEIC ACIDS (DNA AND RNA), GROWTH AND MULTIPLICATION OF YEAST CELLS
 E N Sokurova et al *In its Radiobiol.* Vol 8 No 1 1968
 p 9-24 refs (See N69-18331 08-04)
 Avail CFSTI

Saccharomyces vini yeast cells strain Megri 139-B received a dose of 110 kr of Co-60 γ -irradiation (1-5% survival) and then were incubated for 30 hours. Samples were taken at various intervals and determinations were made of survival (microcolonies method) the number of cells the percentage of germination the quantity of biological mass and the DNA and RNA contents. Without preventing first postradiation germination the irradiation inhibited further multiplication of the culture much more than RNA synthesis and growth of the biological mass. DNA synthesis had an intermediate position in radiosensitivity. Author

N69-18334# Atomic Energy Commission Washington D C
Div of Technical Information

THE EXCRETION OF THYMIDINE AND β -AMINOISOBUTYRIC ACID (BA, MA) IN RATS AS A FUNCTION OF THE DOSE OF THYMIDINE AND DNA, INTRODUCED INTO THE ORGANISM

V K Mazurik *In its Radiobiol* Vol 8 No 1 1968 p 25-34
refs (See N69-18331 08-04)

Avail CFSTI

Seventy male rats of the August line weighing 200 to 275 g were administered thymidine and equimolar quantities of DNA pentoneally in doses of 4 5 6 7 and 8 micromoles/100 g of weight in physiological solution Food and water were given without limitations Samples of urine were taken and the thymidine and β -aminoisobutyric acid contents determined every six hours for a day before and after injection Thymidine excretion increased in the first 12 hours after injection that of β -aminoisobutyric acid was identical at all doses About 90 to 95% of the thymidine regardless of the dose is used in oxidative splitting of thymidine and in DNA synthesis Analysis indicated that disturbance of the reductive degradation of thymidine and of the final stages in DNA synthesis can play a substantial role in increasing thymidine excretion

Author

N69-18335# Atomic Energy Commission Washington D C
Div of Technical Information

CHANGE IN THE CALCIUM CONTENT IN THE TISSUES OF RABBITS UNDER THE ACTION OF IONIZING RADIATION AND SUBSTANCES THAT INFLUENCE OXIDATIVE PHOSPHORYLATION

S P Grozdov *In its Radiobiol* Vol 8 No 1 1968 p 35-46
refs (See N69-18331 08-04)

Avail CFSTI

Calcium potassium and sodium were investigated in the blood serum and tissue hydrolyzates of intact rabbits and rabbits subjected to the following effects total γ -irradiation in a dose of 800 r by a cobalt source at a dose rate of 190 r/minute studied 24 hours and 8 days after irradiation) subcutaneous injection of Po-210 in a dose of 0.1 μ curie/kg (studied 16 days later) and intravenous administration of 6 ml of 0.4% solution of 2,4-dinitrophenol 4 ml of 2.5% solution oleinate and 1.2 ml of 0.25% solution of adenosine triphosphate (ADP) (studied after 15 8 and 7 minutes respectively) A considerable increase of calcium in the tissues followed the administration of Po-210 and increase also was caused by 2,4-dinitrophenol and sodium oleinate

Author

N69-18336# Atomic Energy Commission Washington D C
Div of Technical Information

INFLUENCE OF NEPTUNIUM-237 ON THE ACTIVITY OF CERTAIN ENZYMES OF PHOSPHORUS METABOLISM

V V Kreslov *In its Radiobiol* Vol 8 No 1 1968 p 47-53
refs (See N69-18331 08-04)

Avail CFSTI

Female rats of the Wistar line with a starting weight of 160-170 g received one intravenous injection of Np-237 in nitric acid solution at a pH value of 2.0 in a dose of 1 μ curie (15 mg) per rat The activity of alkaline and acid phosphatase and ATP-ase was investigated 1 3 7 14 and 30 days later in the liver and kidney tissues In the kidneys the activity of alkaline phosphatase was 50 percent of the control level a day later and about 20 percent after two weeks when it rose but it still was below the control levels after a month the acid phosphatase activity decreased 30 percent in the first days and remained on that level for one

month In the liver the activity of both the alkaline and acid phosphatases decreased almost 50 percent in the first days then gradually increased to the level of the controls NP-237 did not affect the ATP-ase activity of the kidneys in a month in the liver the activity tended to increase in the first two weeks but returned to normal after a month

Author

N69-18337# Atomic Energy Commission Washington D C
Div of Technical Information

ON THE QUESTION OF PERMEABILITY AND THE BINDING OF S-35 CYSTEAMINE TO THE COMPONENTS OF THE LOACH SPERM CELL

I D Vinogradova et al *In its Radiobiol* Vol 8 No 1 1968 p 54-62 (See N69-18331 08-04)

Avail CFSTI

Sperms of *Misgurnus fossilis* were incubated with 35 S-tagged cysteamine and their activity was measured after they were washed five times with physiological solution The cells could retain some of the introduced activity Much of the activity is not strongly connected with the DNP of the cells and is readily liberated during water shock and first extraction of the nucleoprotein but a small portion of a stronger complex of the protector with the DNP of the sperm cell exists which is not destroyed even during repeated treatment of the nucleoprotein

Author

N69-18338# Atomic Energy Commission Washington D C
Div of Technical Information

STRONTIUM-90 METABOLISM IN GROWING RATS AS A FUNCTION OF THE AGE AND STATE OF THE CALCIUM METABOLISM

Z V Dubrovina et al *In its Radiobiol* Vol 8 No 1 1968 p 63-73 refs (See N69-18331 08-04)

Avail CFSTI

The offspring of female rats of the Wistar line which had received rations with identical ^{90}Sr activity ($\approx 2.5 \times 10^{-8}$ curies/animal/day) but with different calcium levels when weaned, received the mother's ration but in a smaller quantity which was increased 10 percent every 10 days Ca^{++} was added in the form of the chloride Some animals received $^{90}\text{SrCl}_2$ with CaCl_2 and some animals $^{90}\text{SrCl}_2$ with $^{45}\text{CaCl}_2$ administered once per os, through a probe or intraperitoneally a day before they were killed numerous groups of 5 to 7 rats were killed during the experiment Group I received 40 percent group II 100 percent and group III 220 to 230 percent of the normal calcium level The P content was identical in all groups and corresponded to the normal physiological requirement (Ca/P ratios of 1.15, 1.075 and 1.03 respectively) The results showed that the only acceptable method of calcium protection is strict observance of normal calcium feeding

Author

N69-18339# Atomic Energy Commission, Washington, D C
Div of Technical Information

BEHAVIOUR OF THE BASIC COMPONENTS OF THE BONE MARROW OF RATS AND MICE DURING LOCAL IRRADIATION

E N Kabakov et al *In its Radiobiol* Vol 8, No 1 1968 p 74-83 refs (See N69-18331 08-04)

Avail CFSTI

The right rear extremities of male SVA mice 7 to 12 weeks old weighing 18 to 20 g and male Wistar rats weighing 180 to 200 g were irradiated at 214 r/min for 10 minutes Five mice and

five rats were killed each day for 10 days and their irradiated and shielded extremities examined. It was found that postradiation regeneration of the bone marrow occurs with a predominance of activity of the erythropoietic part. The regeneration may be called erythroid, with a high rate of accumulation of normoblasts (doubling in about 8 hours), a considerably higher than normal level of those cells in the marrow, a high maturation index in the erythroid population and inadequate mitotic activity. The hypothesis is expressed that a transformation of lymphocytes into erythroid cells occurs which becomes cyclic under the effect of radiation damage. Author

N69-18340# Atomic Energy Commission, Washington, D C
Div of Technical Information

THE INFLUENCE OF IONIZING RADIATIONS UPON THE MECHANISMS OF THE DEVELOPMENT OF THE FEVER REACTION

N A Kalinina *In its Radiobiol* Vol 8 No 1 1968 p 84-89
refs (See N69-18331 08-04)
Avail CFSTI

Rabbits were irradiated with 1000 r at 17.6 r/minute and five days later were administered 0.3 ml of turpentine in the hip region. Before the experiment and every two hours for 24 hours after administration of the turpentine the leukocytes in the peripheral blood were counted and the temperature was measured rectally. Aseptic peritoneal exudate obtained 16 hours after intraperitoneal injection of apyrogenic physiological solution in donor rabbits was used as an endogenic pyrogen. In the irradiated rabbits acute radiation sickness developed in a severe form: they lost weight, and sharply expressed leukopenia developed. Febrile reaction was much more weakly expressed than in unirradiated rabbits, not through suppression of ability to react to endogenic pyrogens but because of reduced formation of those pyrogens, evidently because of a sharp reduction in the number of leukocytes and a slower and weaker development of the inflammatory process. Author

N69-18341# Atomic Energy Commission, Washington, D C
Div of Technical Information

CYTOCHEMICAL INVESTIGATION OF GLYCOGEN OF THE ELEMENTS OF THE THROMBOCYTIC SYSTEM. THE INFLUENCE OF IONIZING RADIATION OF THE ORGANISM.

N V Traskunova *In its Radiobiol* Vol 8, No 1 1968 p 90-94
refs (See N69-18331 08-04)
Avail CFSTI

Forty-four rabbits of both sexes weighing 2.5 to 3.0 kg received a dose of 600 r of x-irradiation at 17 to 17.6 r/minute. The peripheral blood and specimens of bone marrow obtained by puncture were investigated one hour and 1, 3, 7, 12, 15, 20, and 30 days after irradiation. A sharp reduction in the glycogen level was observed. The impoverishment of the megakaryocytes in glycogen occurred in parallel with the development of thrombocytopenia in the peripheral blood. Application of stimulators of thrombocytopoiesis permitted preserving some predominance of glycogen-containing megakaryocytes in the experimental animals as compared with animals only irradiated. One way by which pharmacological and hormonal agents can influence thrombocytopoiesis of irradiated animals is by action on the intracellular metabolic processes of the megakaryocytes. Author

N69-18342# Atomic Energy Commission, Washington, D C
Div of Technical Information

INFLUENCE OF CYSTAMINE ON POSTTRAUMATIC REGENERATION OF LOCALLY IRRADIATED SKELETAL MUSCULATURE

A A Klishov et al *In its Radiobiol* Vol 8, No 1 1968
p 95-100 refs (See N69-18331 08-04)
Avail CFSTI

The anterior tibial muscle was incised in 30 white rats weighing 150 g divided in four groups: (1) unirradiated; (2) after irradiation with a dose of 3 kr; (3) after administration of cystamine; and (4) after administration of cystamine local irradiation for two hours and after two more hours, injury of the irradiated muscle. The prophylactic administration of cystamine caused some improvement in the course of recovery of the skeletal muscle locally irradiated and, therefore, has some radioprotective effect although slight, on the muscle tissue. Author

N69-18343# Atomic Energy Commission, Washington, D C
Div of Technical Information

THE BEHAVIOUR OF PLUTONIUM (Pu 239) IN YOUNG PIGS

L A Buldakov *In its Radiobiol*, Vol 8, No 1 1968 p 101-106
refs (See N69-18331 08-04)
Avail CFSTI

The distribution of 1% citric acid solution of Pu-239 (pH = 6.5) was investigated after administration of 3 μ curies intravenously to 15 young pigs 2.5 months old and weighing 10 to 12 kg and 33 μ curies perorally. Animals from the first group were killed in groups of three on 1, 9, 65, 330, and 640 days after injection and those of the second group on the day after administration. The absorption of plutonium citrate was 0.19% in the intestines and 87% of the resorbed portion of Pu was retained in the skeleton. The maximum content in the spongy bones was only three times (after intravenous injection 3 to 10 times) as much as in the compact parts of the skeleton. The Pu concentration in the bones was 3 to 10 times as large as in the soft tissues (excluding muscles) after peroral and 20 to 100 times as large after intravenous administration. Author

N69-18344# Atomic Energy Commission, Washington, D C
Div of Technical Information

DISTRIBUTION AND BIOLOGICAL EFFECTS OF AMERICIUM-241

G A Zalikin et al *In its Radiobiol* Vol 8, No 1 1968
p 107-118 refs (See N69-18331 08-04)
Avail CFSTI

Americium-241 was administered in the form of the chloride intravenously and intratracheally (0.5 and 0.3 ml respectively 2 μ curies/liter) and perorally (1.0 ml 2 and 19 μ curies/liter) to white rats weighing an average of 200 g. At certain intervals the rats were killed and samples taken from the organs and tissues for determination of γ -radiation as percent of the introduced activity. After intravenous administration AM-241 rapidly accumulates in the liver (about 57%) and skeleton (about 18%) and high accumulations are noted in the kidneys (1.1%), liver (7.1%), bones (1.41%), spleen (0.65%), thyroid gland (0.43%), adrenal glands (0.18%), and ovaries (0.03%). After intratracheal administration it was slowly absorbed from the lungs; the effective period of half-excretion of the excreted portion is 66 days. In peroral administration not more than 0.03% is absorbed from the gastrointestinal tract. Author

N69-18345# Atomic Energy Commission, Washington, D C
Div of Technical Information

NUMBER OF IMMUNOCOMPETENT AND COLONY FORMING CELLS IN THE MOUSE SPLEEN AT VARIOUS PERIODS AFTER IRRADIATION

V A Kozlov et al *In its Radiobiol*, Vol 8, No 1 1968
p 119-130 refs (See N69-18331 08-04)

Avail CFSTI

Mice of inbred CBA line were irradiated with cobalt γ -rays in a dose of 600 r and investigated 1, 7, 30, and 60 days later. Maximum suppression of antibody formation was observed after 1 and 7 days. It was partially restored after 30 days but even after 60 days the number of immunocompetent cells in the spleen was only 59 and 46 percent of the controls. The quantity of colony forming units was sharply reduced after 1 and 7 days after 30 days it was 103 percent in terms of 1×10^7 cells of the spleen and 63 percent in terms of the entire organism. Author

N69-18346# Atomic Energy Commission, Washington, D C
Div of Technical Information

TIME INTERVAL BETWEEN IRRADIATION AND MITOSIS IN A CULTURE OF HUMAN LEUKOCYTES AND NUMBER OF CHROMOSOME ABERRATIONS

V M Kozlov *In its Radiobiol*, Vol 8, No 131-134 refs (See N69-18331 08-04)

Avail CFSTI

Irradiation of human leukocytes in the presynthetic state in vitro with ^{60}Co γ -rays in a dose of 100 r caused chromosome aberrations in 20 percent of the cells, most of them paired fragments and dicentric with a single pair of fragments. Increase of the interval between irradiation and mitosis by days in human leukocytes in vitro does not change the cytogenetic effect of irradiation. Author

N69-18347# Atomic Energy Commission Washington, D C
Div of Technical Information

INFLUENCE OF CYSTAMINE AND MAGNESIUM IONS ON THE INDUCTION OF TEMPERATE PHAGE λ INDUCED BY X-RAYS

M A Guberniev et al *In its Radiobiol*, Vol 8, No 1 1968
p 135-145 refs (See N69-18331 08-04)

Avail CFSTI

A four hour bouillon culture of lysogenic cells of *E. coli* K-12 (λ) and one day indicator strain *E. coli* C-85 were x-irradiated with a dose of 4000 r at 67.5 r/sec. The modifying effect of magnesium ions on phage induction caused by ionizing radiation was studied and it was shown that MG is necessary not only for intracellular development of the bacteriophage but also for its induction by the action of ionizing radiation on lysogenic bacteria. The complete removal by MG ions of the anti-induction effect of cystamine on lysogenic bacteria was reproduced. It is proposed that one of the possible mechanisms of the radioprotective action of cystamine is the binding by the protector of magnesium ions in the bacterial cell. Author

N69-18348# Atomic Energy Commission Washington D C
Div of Technical Information

THE INFLUENCE OF γ -RAYS ON THE FORMATION OF ANEUPLOIDY DURING MITOSIS

M M Antoshchina *In its Radiobiol*, No 8 No 1 1968
p 146-150 refs (See N69-18331 08-04)

Avail CFSTI

Plasma obtained from the blood of a woman 25 to 35 years old was irradiated with ^{60}Co γ -rays in a dose of 100 r and cultivated, and the cells were fixed after 60, 72, 85, 95, 110 and 120 hours. After irradiation the frequency of hypoploid cells increases in the second mitosis (fixation after 85 to 85 hours) and is reduced to the spontaneous level in the third (110 to 120 hours). The frequency of hyperploid cells is far smaller and its variation in time is statistically unreliable. Author

N69-18349# Atomic Energy Commission, Washington, D C
Div of Technical Information

INFLUENCE OF CYSTAMINE ON BLOOD VESSEL TONUS BEFORE AND AFTER IRRADIATION

J I Bachurina *In its Radiobiol*, Vol 8 No 1 1968 p 151-156
refs (See N69-18331 08-04)

Avail CFSTI

Isolated rabbit ears from four groups (intact animals, animals administered cystamine, irradiated animals, and irradiated animals who had received cystamine) (irradiation—a dose of 800 r at 24.8 r/minute) were tested by the perfusion method with $p = 70$ cm col H_2O and $t = 37$ to 39°C . There were no substantial differences in perfusion between intact animals and irradiated animals which had received cystamine. Weakening of the vasoconstrictive reactions of rabbit ear, usually observed in the period of primary reaction to irradiation, can be connected with the spasmolytic and adrenolytic action of cystamine. Author

N69-18350# Atomic Energy Commission, Washington, D C
Div of Technical Information

INFLUENCE OF PROTECTORS ON THE IRREVERSIBLE COMPONENT OF RADIATION INJURY

J P Yarmonenko et al *In its Radiobiol*, Vol 8 No 1 1968
p 157-166 refs (See N69-18331 08-04)

Avail CFSTI

AET, mexamine MEA and cystaphos were administered to white mice and rats (150, 75, 150 and 350 mg/kg to mice and 100, 15, 100 and 350 mg/kg to rats) intraperitoneally 10 minutes before irradiation with a single dose of x-rays (180 kV), Co-60 γ -rays or 680 MeV of protons. Examinations were made in the first mitosis in the bone marrow 12-24 hours after irradiation and in the liver 30 hours after partial hepatectomy carried out one day after irradiation. The radiosensitivity of liver and bone marrow cells differed little on the basis of chromosome aberrations each had 15 to 20 percent aberrant cells per 100 r. Mexamine was almost identically effective in protecting both types of cells whereas the thiol protectors were ineffective with respect to liver cells. The possible role of radiation injuries of the chromosomes in the formation of the irreversible component of damage to the organism was examined. In actively proliferating tissues it is manifested in both acute and remote effects of irradiation, but in tissues with low physiological regeneration mainly causes remote aftereffects. Author

N69-18351# Atomic Energy Commission Washington, D C
Div of Technical Information

REDISTRIBUTION IN THE SYNTHESIS OF NEWLY FORMED RNA FRACTIONS AFTER IRRADIATION

V I Tokarskaya et al *In its Radiobiol*, Vol 8 No 1 1968
p 167-177 refs (See N69-18331 08-04)

Avail CFSTI

Unsprouted germs of the seed of the radiosensitive pea

variety Pobeditel both dry and after being soaked in water for four hours received a dose of 20 kr at 700 r/min (^{137}Cs). In the first series of experiments the seeds were again moistened after irradiation and the germs were removed and again exposed for 20 minutes 4 hours and 16 hours in inorganic phosphate ^{32}P solution. In the second series 7-day sprouts were exposed in a sealed chamber in a ^{14}CO atmosphere, the high-polymer RNA was separated by means of sodium dodecylsulfate at pH = 5.0 and then treated with DNA-ase. The DNA-ase was then separated and the RNA analyzed chromatographically. The composition of the RNA fractions tagged with ^{32}P was determined after alkaline hydrolysis and electrophoresis on the basis of the radioactivity of the 2', 3' mononucleotides. A redistribution of the synthesis of the RNA fractions was found. After irradiation the synthesis of RNA with an AU type of nucleotide composition decreases and the rate of synthesis of ribosomal RNA increases. Author

N69-18352# Atomic Energy Commission, Washington, D. C. Div. of Technical Information

THE FORMATION OF FORMYL DERIVATIVES OF FOLIC ACID IN THE HYALOPASM OF THE PIGEON LIVER AFTER IRRADIATION AND ADMINISTRATION OF A PROTECTOR

E. F. Romantsev et al. *In its Radiobiol.* Vol. 8, No. 1, 1968, p. 178-183, refs. (See N69-18331 08-04)

Avail. CFSTI

Pigeons were irradiated with the absolutely minimum lethal dose of γ -rays, 3000 r in 19 minutes 2 seconds. The formation of formyl derivatives of folic acid in liver extract was inhibited in 10 to 60 minutes and was normalized in 24 hours. The injection of β -mercaptopyropylamine (200 mg/kg) a dose with a strongly expressed radioprotective action caused a sharp suppression of the synthesis of the formyl derivatives of folic acid 10 minutes after injection. Author

N69-18353# Atomic Energy Commission, Washington, D. C. Div. of Technical Information

THE INFLUENCE OF PERIODS OF STORAGE OF IRRADIATED SEEDS AND FRACTIONATION OF THE γ -RADIATION DOSE ON THE RADIOSENSITIVITY OF THE COTTON PLANT AND CHANGE IN THE RADIOSENSITIVITY DURING ONTOGENESIS

N. N. Nazirov et al. *In its Radiobiol.* Vol. 8, No. 1, 1968, p. 184-196, refs. (See N69-18331 08-04)

Avail. CFSTI

Dry seeds of early ripening radioresistant variety 1306-DV and late ripening radiosensitive variety S-1622(16) of *Gossypium hirsutum* were irradiated with 5, 10, 15, and 20 kr doses of Co-60 γ -rays at 23 r/sec and stored 1, 27, 63, and 127 days for both varieties and 3 years for S-1622 under room conditions then soaked in water and sown. During storage for 3 years of seeds irradiated with relatively massive doses, the biological effect of irradiation was intensified. Radiostimulation was expressed more strongly in the late ripening than in the early ripening variety. A single massive irradiation was more harmful than fractionated irradiation at the same dose. The processes of formation of morphological signs were more sensitive to irradiation than growth processes. The radiosensitivity of cotton varies noticeably during ontogenesis. High sensitivity appears in the first period of development and reaches a minimum toward the start of blossoming, which coincides with the moment of natural growth in height. Author

N69-18354# Atomic Energy Commission, Washington, D. C. Div. of Technical Information

EFFECT OF γ -IRRADIATION OF SEEDS ON THE SURVIVAL, GROWTH, DEVELOPMENT, AND FRUIT-BEARING OF *ARABIDOPSIS THALIANA* (L.) HEYNH

V. I. Ivanov et al. *In its Radiobiol.* Vol. 8, No. 1, 1968, p. 197-207, refs. (See N69-18331 08-04)

Avail. CFSTI

Arabidopsis thaliana (L.) Heynh. shoots 2 to 4 months old were irradiated with Co-60 γ -rays in doses of 10, 20, 40, 70, 110, 160, 220, and 290 kr at a rate of ≈ 3.7 kr/minute. They were placed at once on the surface of an agarized mineral nutrient medium and raised in a light chamber with a cycle of 20 hours of light at $\approx 25^\circ\text{C}$ and 4 hours of darkness at 19°C . Phenological observations were made daily for 8 weeks. The number of stalks was counted during the generative phase. The plant was found to be highly radioresistant with LD_{50} of ≈ 100 kr. Germination was effected least without decrease at up to 300 kr. Most deaths occurred in the phases of cotyledonous leaves and rosettes but most plants surviving those phases at up to ≈ 160 kr reached fruit bearing. The growth of root and stalk was halved at ≈ 20 kr; the rate of vegetative development at ≈ 70 -100 kr and the rate of generative development at ≈ 40 to 70 kr. With increase of the dose the percentage of fruitful plants decreases ($\text{D}_{50} = \approx 160$ kr) as does the average number of seeds of fruitful plants. Author

N69-18355# Atomic Energy Commission, Washington, D. C. Div. of Technical Information

GROWTH AND SURVIVAL OF THE FERN (*PTERIS LONGIFOLIA* L.) AS A FUNCTION OF THE DOSE OF X-RADIATION AND TIME OF SOWING OF SPORES AFTER IRRADIATION et al. *In its Radiobiol.* Vol. 8, No. 1, 1968, p. 208-217, refs. (See N69-18331 08-04)

Avail. CFSTI

Dry spores of the fern *Pteris longifolia* L. received x-irradiation of 30, 60, 120, 240, and 350 krad at 17.2 krad/minute and 5, 10, 20, 50, 100, 190, 280, and 370 krad at 4.7 krad/minute and then were sown after various intervals of time. The material was examined after 10, 20, and 30 days. It was found that the germination of spores and growth of gametophytes depend on the absorbed dose and the time between irradiation and sowing. At doses of 350 to 370 krad (sowing at once), 240 to 280 krad (sowing after a month), and 120 to 190 krad (sowing after a year) no spores germinate at all. The germination of spores and growth of gametophytes decreases with increase of the time between irradiation and sowing. LD_{50} was 50 krad (sowing at once), 35 krad (sowing after a month), and 25 krad (sowing after a year). Author

N69-18356# Atomic Energy Commission, Washington, D. C. Div. of Technical Information

DOSIMETRIC CHARACTERISTICS OF X-RADIATION AND MEASUREMENT OF ABSORBED DOSES IN THE IRRADIATION OF SMALL BIOLOGICAL SPECIMENS

Yu. B. Nikulin et al. *In its Radiobiol.* Vol. 8, No. 1, 1968, p. 218-224, refs. (See N69-18331 08-04)

Avail. CFSTI

The measurement is determined of the quality of radiation generated under specific conditions of radiation and of the absorbed doses obtained in that case by water equivalent biological objects with a volume of not more than 2 to 3 ml irradiated near the focus of the tube to obtain as large a dose rate as possible. It was found that to describe the x-irradiation with a maximum

voltage on the tube of 50 to 200 kV it is necessary to note the following characteristics: the maximum voltage on the tube, the effective radiation energy, the layer of half-attenuation, the coefficient of uniformity and the absorbed dose rate. The effective energy can remain constant with the use of near focus apparatus while the dose rate varies by ± 25 percent because of various factors not readily taken into account. Therefore, the dosimetry should be carried out immediately before irradiation. Author

N69-18357# Atomic Energy Commission, Washington, D. C. Div. of Technical Information

POSSIBILITIES OF USING SEMICONDUCTOR DETECTORS OF IONIZING RADIATION IN RADIOBIOLOGY AND MEDICINE

A. A. Petushkov. *In its Radiobiol.* Vol. 8, No. 1, 1968, p. 225-236, refs. (See N69-18331 08-04)

Avail. CFSTI

A literature survey is presented on applications of semiconductor detectors of ionizing radiation in radiobiology and medicine. The most suitable are those based on silicon and germanium with p-n and p-i-n junctions (small dimensions, high energy resolution, low power consumption, etc.) but they have low radiation resistance and require special electronic equipment to record signals. They are promising in radiometric and spectrometric analyses in investigations of the distribution, separation, and content of radioactive substances in the living organism. Surface barrier AuSi detectors are used in work with α -radioactive isotopes and diffusion-drift Si(Li) detectors in work with β - and α -emitters. Author

N69-18358# Atomic Energy Commission, Washington, D. C. Div. of Technical Information

RANGES OF PROTONS IN BIOLOGICAL TISSUE

G. G. Drozd. *In its Radiobiol.* Vol. 8, No. 1, 1968, p. 237-244, refs. (See N69-18331 08-04)

Avail. CFSTI

Calculations are presented on the path of protons in biological tissue in the energy range of 500 eV to 10 MeV. A formula is used for the region 500 eV to 1.0 keV; a formula is derived for the region 1.0 to 900 keV, and literature data are used for the region 900 keV to 10 MeV, with good fit of the curve segments. Author

N69-18359# Atomic Energy Commission, Washington, D. C. Div. of Technical Information

ON THE DIVISION OF THE NEUTRON SPECTRUM INTO GROUPS

G. G. Drozd. *In its Radiobiol.* Vol. 8, No. 1, 1968, p. 245-253, refs. (See N69-18331 08-04)

Avail. CFSTI

Energy ranges are reviewed used to divide the neutron spectrum into groups and a division of the spectrum of neutrons acting on biological tissue is proposed which takes into consideration two main processes: interactions of neutrons with the nuclei of atoms of the tissue and interactions of secondary particles forming during the action of neutrons on the tissue with elements of the tissue. The proposed energy ranges are: 0 to 1.0 eV for thermal, 1.0 eV to 5 keV for slow (epithermal), 5 keV to 1 MeV for intermediate, 1 to 50 MeV for fast, and above 50 MeV for ultrafast neutrons. Author

N69-18360# Atomic Energy Commission, Washington, D. C. Div. of Technical Information

THE ROLE OF THE OXYGEN EFFECT IN THE RADIOPROTECTING ACTION OF PROPYLAMINE AND ITS DERIVATIVES

M. M. Konstantinova et al. *In its Radiobiol.* Vol. 8, No. 1, 1968, p. 254-257, refs. (See N69-18331 08-04)

Avail. CFSTI

White mice of both sexes weighing 18 to 20 g were irradiated with 900 r of Co-60 γ -rays at 217 r/minute. The following were administered in 0.3 ml of distilled water: 15, 30, 60, 90, and 120 minutes before irradiation or measurement of the oxygen content in the tissues: 6 mg of propylamine (PA), 16.5 mg of β -mercaptopropylamine (MPA), 2.75 mg of dimercaptopropylamine (DMPA), 3.6 g of γ -bromopropylamine (MBPA), and 4.5 mg of dibromopropylamine (DBPA). PA had no protective effect and did not influence the oxygen content in the spleen. MPA gave 60 to 80 percent survival depending on the time between administration and irradiation. DMPA greatly increased the radioresistance of mice irradiated 30 minutes after its administration. With MBPA and DBPA the protective activity increased in proportion to the time between administration and irradiation (a maximum at 90 minutes). Author

N69-18361# Atomic Energy Commission, Washington, D. C. Div. of Technical Information

THE FREQUENCY OF ABERRANT CELLS AND THE AMOUNT OF BLOCKING OF THE CELL CYCLE AS A FUNCTION OF UV IRRADIATION

A. G. Antoshechkin et al. *In its Radiobiol.* Vol. 8, No. 1, 1968, p. 258-262, refs. (See N69-18331 08-04)

Avail. CFSTI

Fibroblast-like aneuploid cells of the Chinese hamster were treated with ^3H -thymidine. UV-irradiated with 260 m μ in doses of 15, 30, and 60 ergs/mm 2 and fixed after definite times of incubation. The time after which 45 percent tagged metaphases occurred was recorded: 15 hours for unirradiated cells and 18, 21, and 28 hours for those receiving 15, 30, and 60 ergs/mm 2 respectively. A dose of 120 ergs/mm 2 led to massive death of the cells. Thus, there was a linear dependence of the amount of blocking of DNA replication on the dose. In studying the appearance of cells with chromosome aberrations, the cells were irradiated with doses of 15, 30, 45, and 60 ergs/mm 2 in the S stage in the period of high sensitivity to UV-irradiation and fixed 10, 12, 14, and 16 hours after those doses respectively. Comparison of the occurrence of cells with chromosome aberrations with the retardation of the cell cycle showed that even 15 ergs/mm 2 retards the cell cycle by about 3 hours. Author

N69-18362# Atomic Energy Commission, Washington, D. C. Div. of Technical Information

THE DEPENDENCE OF THE RADIOSENSITIVITY OF RATS ON INDIVIDUAL DIFFERENCES IN THE CALCULATED AND ACTUAL OXYGEN CONSUMPTION

L. Novak et al. *In its Radiobiol.* Vol. 8, No. 1, 1968, p. 263-267, refs. (See N69-18331 08-04)

Avail. CFSTI

Male Wistar rats in two groups, 45 to 60 days old and one group 95 to 105 days old, after measurement of their respiratory metabolism level, were irradiated with doses of 600, 675, and 800 r at 50 r/minute for the respective groups, then kept in isolation without limitations on food or drink. The animals were weighed daily and deaths were recorded. The results confirm previous data on variation of body weight after nonlethal exposures as a function of the difference between the oxygen consumption measured in an

experimental animal before irradiation and the theoretical consumption calculated from the minimum requirements of the organism to maintain thermal homeostasis
Author

N69-18363# Atomic Energy Commission Washington D C
Div of Technical Information
THE PROPHYLACTIC ACTION OF EXOGENOUS INTERFERON CULTURES OF CHICK EMBRYO FIBROBLASTS AFTER X-RAY IRRADIATION
E A Lvovskii et al *In its Radiobiol* Vol 8 no 1 1968
p 268-272 refs (See N69-18331 08-04)
Avail CFSTI

Chicken interferon obtained by infection of 9 to 10 day embryos with virus of group A of strain PR₈ was introduced into the allantoic cavity in a quantity of 10⁴ chicken embryo doses. The allantoic fluid was taken 72 hours later and purified of influenzal virus by centrifugation. The remaining virus was inactivated by heating and the obtained interferon was diluted with 30-fold hemohydrolyzate to reduce its activity. The preventive effect of the interferon was determined by its ability to inhibit the multiplication of vesicular stomatitis virus in normal and irradiated (200, 600, and 1800 rads of x-irradiation) cultures of chick embryonal fibroblasts. The antiviral activity of the interferon was reduced in the irradiated cultures in direct proportion to the dose and time elapsed between their irradiation and infection
Author

N69-18364# Atomic Energy Commission Washington D C
Div of Technical Information
EXPERIMENTS ON THE IRRADIATION OF DUCKWEED (LEMNA MINOR L.) BY γ -RAYS AND FAST NEUTRONS
M P Leinerte *In its Radiobiol* vol 8 no 1 1968 p 273-276
refs (See N69-18331 08-04)
Avail CFSTI

Duckweed was irradiated with doses of 250 1000 4000, 16 000 and 64 000 rads of γ -rays and physically equivalent doses of fast neutrons. After two months the number and weights of the plants were determined as percentages of a control. Very small doses of γ -rays (up to 4000 rads) had a very weak effect even a tendency to increase the weight at 250 and the number at 4000 rads and at 64 000 rads the number and weight were 30 to 40 percent of the control. Physically equivalent doses of fast neutrons had a much stronger effect 80 to 90 percent of the weight and number of the control at 250 rads 15 to 20 percent at 16 000 and 100 percent mortality at 64 000 rads
Author

N69-18365# Atomic Energy Commission Washington D C
Div of Technical Information
CONTENT OF FREE SEMIQUINONE RADICALS AND THEIR PRECURSORS IN MAMMALIAN TISSUES DIFFERING IN RADIOSENSITIVITY
A M Kuzin et al *In its Radiobiol* Vol 8 No 1 1968
p 277-280 refs (See N69-18331 08-04)
Avail CFSTI

Tissues of the brain, muscle, kidneys, lungs, liver and spleen of the bull, ram and sow were frozen with liquid nitrogen and lyophilized to a moisture content of 1 to 2 percent. The EPR method was used to determine the quantity of free semiquinoid radicals in the tissue and the dynamics of their increase in the presence of moistened oxygen which reveals the quantity of their predecessors capable of giving free semiquinoid radicals during oxidation. The results showed that decrease of susceptibility to radiation injury during irradiation correlates well with reduction of such predecessors
Author

N69-18366# Atomic Energy Commission Washington D C
Div of Technical Information
THE SR-90 ACCUMULATION FACTOR IN PLANKTON OF DIFFERENT BODIES OF WATER
Z K Kaliniya et al *In its Radiobiol* Vol 8 No 1 1968
p 281-283 refs (See N69-18331 08-04)
Avail CFSTI

Tables are presented characterizing the plankton of a eutrophic, a mesotrophic-eutrophic and a dystrophic lake in different months and their ⁹⁰Sr accumulation factors in the summer of 1966. A small calcium content in the water of the dystrophic lake (4-6 mg/liter) meant that its plankton had a larger capacity for ⁹⁰Sr accumulation than the plankton of the other types of lake
Author

N69-18367# Atomic Energy Commission, Washington D C
Div of Technical Information
RADIOBIOLOGY, VOLUME 8, NUMBER 2
1968 259 p refs Transl into ENGLISH from Radiobiologiya (Moscow) v 8 no 2, 1968 p 1-265
(AEC-tr-6915-Vol-8-No-2) Avail CFSTI

Radiobiological studies on man, animals, plants, and microorganisms are presented. Emphasis is placed on antiradiation drugs and genetic mutation effects. For individual titles see N69-18368 through N69-18401

N69-18368# Atomic Energy Commission Washington, D C
Div of Technical Information
QUANTITATIVE PRINCIPLES OF THE REALIZATION OF POTENTIAL DAMAGES IN IRRADIATED YEAST CELLS
Yu G Kapul'tsevich et al *In its Radiobiol* Vol 8 No 2 1968
p 1-10 refs (See N69-18367 08-04)
Avail CFSTI

Repair processes take place in irradiated yeast cells not only when they are incubated in starvation medium, but also in the case of postradiation culturing on nutrient media until potential damages have been realized, i.e., converted to an irreversible state. It was shown that the realization of potential damages does not occur simultaneously in all individuals of the population, and that in each cell it occurs within a rather short period of time during division of the nucleus. Consequently, there is some distribution of cells according to periods of realization of potential damages. This communication was devoted to an experimental determination of this distribution
Author

N69-18369# Atomic Energy Commission Washington D C
Div of Technical Information
SUPPRESSION OF THE SYNTHESIS OF NEW TYPES OF RNA IN EMBRYOS OF PEA SEEDS BY IRRADIATION
S R Umanskii et al *In its Radiobiol* Vol 8, No 2 1968
p 11-20 refs (See N69-18367 08-04)
Avail CFSTI

The synthesis of various classes of RNA in the embryonic tissue of seeds begins almost with the first hours of swelling. The synthesis of the DNA-like fractions is sharply inhibited by irradiation while the synthesis of rRNA, on the contrary, increases substantially. The decrease not only in the height but also in the number of peaks of Au-type RNA after irradiation led to the idea of a possible change in the set of active genes—repression of certain genes and activation of others under the influence of irradiation. The present work was undertaken to clarify this question. The

method of artificial DNA-RNA hybridization is a reliable method, permitting an evaluation of the set of active genes. Using this method we attempted to compare the RNA population in normal and irradiated tissue, as well as the RNA of embryonic tissue of seeds at various hours of swelling. Author

N69-18370# Atomic Energy Commission Washington, D C
Div of Technical Information

KINETICS OF THE HYDROLYSIS OF SODIUM PHENYLPHOSPHATE UNDER THE ACTION OF IRRADIATED ALKALINE PHOSPHATASE IN COMPARISON WITH THE ACTION OF NON-IRRADIATED ALKALINE PHOSPHATASE

E B Nikol'skaya *In its Radiobiol* Vol 8 No 2 1968 p 21-28
refs (See N69-18367 08-04)

Avail CFSTI

In this work we undertook to study the dependence of the enzymatic hydrolysis of PP under the action both of irradiated and of nonirradiated alkaline phosphatase, depending upon the substrate concentration, at pH 10.1. We were especially interested in the question of whether the position of the maximum on the curve of the initial rate versus substrate concentration, the composition of the inactive complex, the form of the kinetic equation, and the kinetic constants are changed by irradiation or not. Author

N69-18371# Atomic Energy Commission Washington, D C
Div of Technical Information

EFFECTS OF IONIZING RADIATIONS UPON THE FREE AMINO ACID POOL IN NUCLEI ISOLATED FROM THE RAT THYMUS, SPLEEN, AND LIVER

L P Belavina *In its Radiobiol* Vol 8 No 2 1968 p 29-35
refs (See N69-18367 08-04)

Avail CFSTI

An increase in the aminonitrogen level in the nuclei of the rat thymus, spleen and liver and individual changes in the free amino acid content were noted one and 24 hours after irradiation of the animals at a dose of 850 R. The following amino acids were identified in protein-free filtrates of nuclei isolated from the rat thymus, spleen and liver: aspartic and glutamic acids, histidine, lysine, arginine, serine, alanine, glycine, leucine, phenylalanine, tyrosine, valine, and methionine. There is an increase in the aminonitrogen level in the nuclei of the thymus and spleen one and 24 hours after irradiation of the animals at a dose of 850 R. The aminonitrogen level in the liver nuclei is unchanged one hour after irradiation and increased after 24 hours. After irradiation the free amino acid content in the nuclei of the rat thymus, spleen and liver experiences individual variations. Author

N69-18372# Atomic Energy Commission Washington, D C
Div of Technical Information

INFLUENCE OF GAMMA RADIATION ON PROTEIN BIOSYNTHESIS IN ISOLATED CHLOROPLASTS

K D Kolomiets et al *In its Radiobiol* Vol 8, No 2 1968
p 36-42 refs (See N69-18367 08-04)

Avail CFSTI

Gamma-radiation exerts a substantial influence upon protein biosynthesis in isolated chloroplasts both at the early stages—two hours after irradiation of leaves and at long-term stages in the case of irradiation of seeds. The nature of these disturbances was manifested in an inhibition of the incorporation of labeled carbon from alanine and malic acid into the proteins of the isolated

chloroplasts. The presence of repair phenomena in the process of protein synthesis was demonstrated in chloroplasts isolated from one-month-old pea plants grown from irradiated seeds. The analogous nature of the disturbance of chloroplast protein biosynthesis in experiments *in vivo* and *in vitro* is evidence that apparently radiation damage to protein biosynthesis is due to the high radiosensitivity of the autonomous system that provides for protein formation, which is subjected to the action of γ -radiation. Author

N69-18373# Atomic Energy Commission Washington, D C
Div of Technical Information

SIGNIFICANCE OF THE CORTICOSTEROID HORMONES IN CHANGES IN THE ALANINE AMINOTRANSFERASE ACTIVITY IN THE BRAINS OF WHITE RATS DURING IRRADIATION BY X-RAYS AND INTERMEDIATE-ENERGY NEUTRONS

L S Cherkasova et al *In its Radiobiol* vol 8, no 2 1968
p 43-52 refs (See N69-18367 08-04)

Avail CFSTI

The article presents data on the rate of enzymatic transamination from alanine to ketoglutarate in the subcellular fractions of the brain after irradiation by X-rays and intermediate-energy neutrons at doses of 40 R and 135 rad respectively, depending upon the initial functional state of the pituitary-adrenal cortex system. The rate of enzymatic transamination from alanine to ketoglutaric acid in the subcellular fractions of the brain is changed after a single whole-body irradiation by X-rays and intermediate-energy neutrons at doses of 40 R and 135 rad, respectively. A great role in the changes in the alanine aminotransferase activity is played by the initial functional state of the pituitary-adrenal cortex system. Author

N69-18374# Atomic Energy Commission Washington, D C
Div of Technical Information

INFLUENCE OF HOT PARTICLES ON HUMAN CELLS

S I Tarasov et al *In its Radiobiol* Vol 8 No 2 1968 p 53-62
refs (See N69-18367 08-04)

Avail CFSTI

In view of the detection of hot particles in the atmosphere and in the air of industrial rooms, the need has arisen for investigating their biological hazard. Particles of cobalt-60 with an activity of 10^{-9} Ci/particle were used as a model of the hot particle. The investigation was conducted on human fibroblasts in tissue culture. Various methods of fixation of the cobalt particles were described. A laser apparatus was successfully used. The biological effects were established: an inhibition of mitosis and an increase in the frequency of chromosome rearrangements. Author

N69-18375# Atomic Energy Commission Washington, D C
Div of Technical Information

CORRELATION OF THE RADIOSENSITIVITY OF MICE OF DIFFERENT LINES WITH THE CONTENT OF SULFHYDRYL GROUPS IN THEIR HEMATOGENIC TISSUE

Lieh Suang Tu *In its Radiobiol* Vol 8 No 2 1968 p 216-219
refs (See N69-18367 08-04)

Avail CFSTI

A distinct positive correlation between the radiosensitivity of male mice of the three lines BALB/c, CC₅₇Br and C₅₇B1 (LD_{50/30} 390 \pm 14 R, 427 \pm 17 R and 550 \pm 16 R respectively) and the total content of sulfhydryl groups in spleen cells (1.722 \pm 0.040, 1.923 \pm 0.032 and 2.330 \pm 0.007 micromoles of SH-groups per 100 mg of tissue, respectively) was established. These data are considered as a confirmation of the concept relating the resistance of a biological object to ionizing radiation and its content of protein or low-molecular thiols. Author

N69-18376# Atomic Energy Commission Washington, D C
Div of Technical Information
CHANGE IN THE HAPTOGLOBIN CONCENTRATION IN THE BLOOD SERUM OF DOGS AND RATS DURING RADIATION SICKNESS

A V Pospelova et al *In its Radiobiol* Vol 8 No 2 1968
p 69-75 refs (See N69-18367 08-04)

Avail CFSTI

The change in the concentrations of haptoglobin and the α_3 -fraction of the blood serum of dogs and rats during radiation sickness was studied in the work. The haptoglobin contents in the blood serum of dogs and rats was determined in the normal state and after irradiation. The haptoglobin concentration in the blood of the animals increased as radiation sickness developed. The increase in the α_3 -globulin fraction of the blood serum of dogs occurs chiefly on account of an increase in the haptoglobin level. Author

N69-18377# Atomic Energy Commission Washington D C
Div of Technical Information

EVALUATION OF THE RESPONSE OF THE ISLET APPARATUS OF THE PANCREAS DURING EXPERIMENTAL ACUTE RADIATION SICKNESS

A I Barkalaya *In its Radiobiol* Vol 8 No 2 1968 p 76-83
refs (See N69-18367 08-04)

Avail CFSTI

During acute radiation sickness in rats induced by γ -irradiation at doses of 600 and 700 R, histomorphological signs of functional overloading of the islet apparatus—hypertrophic and hyperplastic processes, in conjunction with pronounced degranulation of the β -cells—develop. At the same time the glycogen level in the liver drops and there is an excess deposition of lipids there. Daily administration of insulin to irradiated rats at a dose of 0.2 unit/kg substantially weakens the hypertrophic and hyperplastic response of the islet apparatus. The definite identity of the results permits us to believe that a definite role in the mechanism of the development of insufficiency of the function of the islet apparatus during radiation sickness is played, among other factors, by activation of the pituitary-adrenal system and the glycemic factor. Author

N69-18378# Atomic Energy Commission, Washington D C
Div of Technical Information

CONTENT OF LIPID PHOSPHORUS AND LIPID RADIOTOXINS IN THE TISSUES OF IRRADIATED RATS

O S Arutyunova et al *In its Radiobiol*, Vol 8 No 2 1968
p 84-92 refs (See N69-18367 08-04)

Avail CFSTI

Directly after γ -irradiation of rats at doses of 700 and 1500 rad, a decrease in the amount of loosely bound phospholipids in the organs and tissues is observed. After irradiation of rats at a dose of 1500 rad on the third day, and after irradiation at a dose of 700 rad on the fourth to fifth day, an increase in the amount of loosely bound phospholipids was detected in comparison with the norm. The increase in the amount and activity of LRT in the initial period of the injury coincides with the period of breakdown of lecithin and cephalin and a general decrease in the amount of natural antioxidants—loosely bound phospholipids. The decrease in the amount and activity of LRT during the following period is accompanied by an increase in the amount of loosely bound phospholipids. Author

N69-18379# Atomic Energy Commission, Washington, D C
Div of Technical Information

SIGNIFICANCE OF THE TIME FACTOR IN THE IRRADIATION OF IMAGO INSECTS (EXPERIMENTS ON GRANARY WEEVILS)

I B Bychkovskaya et al *In its Radiobiol* Vol 8, No 2 1968
p 93-98 refs (See N69-18367 08-04)

Avail CFSTI

In the work we analyzed the dependence of the survival rate of granary weevils upon the value of the radiation dose at various irradiation intensities. The death rate of granary weevils irradiated with the γ -rays of ^{60}Co in the dose rate range from 40 to 3.5 R/minute differs little. When the irradiation intensity is changed only slightly from 3.5 to 2.2 and 1.5 R/minute there is an abrupt drop in the vulnerability. Curves of the dependence of the survival rate of granary weevils upon the radiation dose at dose rates of 40-7 R/minute have a typical S-shaped form. At 2.2 and 1.5 R/minute the S-shape is lost, and the curves become step-wise. An abrupt drop in the vulnerability of the weevils, as well as a distortion of the shape of the dose-versus-effect curve occurs when a definite duration of irradiation is reached, equal to approximately three to five days (the 'critical time'). Author

N69-18380# Atomic Energy Commission, Washington, D C
Div of Technical Information

CYTOLOGICAL CHANGES IN THE EPITHELIUM OF THE MUCOUS MEMBRANE OF THE RAT SMALL INTESTINE UNDER THE PROLONGED INFLUENCE OF RADIONUCLIDES

L Ya Zhorno et al *In its Radiobiol*, Vol 8 No 2 1968
p 99-104 refs (See N69-18376 08-04)

Avail CFSTI

The influence of chronic internal irradiation by radionuclides upon the state of the epithelium of the mucous membrane of the small intestines was studied in experimental rats of three groups, which received a mixture of isotopes with initial activity 15, 1.5 and 0.15 $\mu\text{Ci/day}$. In the case of prolonged administration of radionuclides, an increase in the number of aberrant mitoses is noted in animals that received isotopes with initial activities of 15 and 1.5 μCi for 30 to 180 days. The time of appearance of the initial changes and their maximum development were directly dependent upon the amount of the isotope administered. A peculiarity of the cytological response of the intestinal epithelium in the experimental rats to the prolonged influence of radionuclides was a conservation of the cytogenetic effect for a long time after the intake of the isotopes ceased. Author

N69-18381# Atomic Energy Commission Washington, D C
Div of Technical Information

ON THE CHANGE IN THE REFLEXES FROM THE CAROTID SINUS DURING THE PRIMARY RESPONSE OF THE ORGANISM TO IRRADIATION

Yu A Lupachev *In its Radiobiol* Vol 8 No 2 1968 p 105-111
refs (See N69-18367 08-04)

Avail CFSTI

The work was devoted to a study of the dependence of the magnitude of the pressor sinocarotid reflexes in rabbits during the period of the primary response, developed after whole-body x-irradiation at a dose of 800 R, upon the method of induction of the reflex. During the period of the primary response to irradiation, clamping of the common carotid artery in rabbits leads to the appearance of perverted (depressor instead of pressor) responses. The elimination of shifting and tightening of the artery during the period of clamping leads to a disappearance of the perverted responses, but the magnitude of the reflex remains lower than in the control rabbits. It may be assumed that the cause of the

appearance of perverted responses in the irradiated animals is an increase in the reflex excitability of the mechanoreceptors of the sinocarotid zone which are stimulated when the walls of the carotid sinus are tightened

Author

N69-18382# Atomic Energy Commission Washington D C
Div of Technical Information

SOME PECULIARITIES OF THE NEURON ACTIVITY OF THE OPTICAL REGION OF THE CEREBRAL CORTEX OF RABBITS SUBJECTED TO THE INFLUENCE OF IONIZING RADIATION DURING LATE EMBRYOGENESIS

I A Kolomeitseva *In its Radiobiol*, Vol 8 No 2 1968 p 112-120 refs (See N69-18376 08-04)

Avail CFSTI

In the control rabbits and rabbits irradiated by x-rays (at a dose of 300 R) at the end of embryogenesis the spontaneous and induced pulsed activity of the neurons of the cortex of the visual analyzer was investigated. An increase in the frequency of the pulsed activity in the background was detected in comparison with the control, along with an increase in the group of cells with irregular discharges and a decrease in the probability of discharging in response to a flash

Author

N69-18383# Atomic Energy Commission, Washington, D C
Div of Technical Information

TISSUE ANTIGENS IN THE BLOOD AND URINE OF ANIMALS DURING RADIATION SICKNESS

K P Kashkin et al *In its Radiobiol* Vol 8 No 2 1968 p 121-129 refs (See N69-18367 08-04)

Avail CFSTI

Radiation sickness of rats is accompanied by the appearance of tissue antigens of the liver and spleen in the blood of the animals. The penetration of these antigens into the blood is of a phase type and corresponds to the early periods of development of radiation sickness and to the period of development of autoinfectious processes. Among the various fractions of the cytoplasm of liver cells, the fractions of the cytoplasmic granules evidently are distinguished by the greatest radiosensitivity, and their antigens appear among the blood proteins of the animals soon after irradiation in large quantities and more often than other antigens. An index of radiation damages to cells of kidney tissue is the appearance of kidney antigens in the urine of the experimental animals soon after irradiation

Author

N69-18384# Atomic Energy Commission, Washington D C
Div of Technical Information

COMPARATIVE STUDY OF THE INTRACELLULAR DISTRIBUTION OF S 35 CYSTAMINE IN THE LIVERS AND SPLEENS OF WHITE MICE AND RATS

V G Vladimirov *In its Radiobiol* Vol 8, No 2 1968 p 130-136 refs (See N69-18367 08-04)

Avail CFSTI

The use of the radioactive tracer method in conjunction with the method of differential centrifuging did not reveal any significant species differences in the intracellular distribution of ³⁵S-cysteamine in the tissues of the liver and spleen in white mice and rats. In experiments on mice it was shown that an increase in the dose of cysteamine leads to an increase in the content of the protector in all subcellular fractions of the liver and spleen. The latter is especially pronounced in the nuclei of cells of these tissues, and in the liver moreover in the mitochondria and microsomes

Author

N69-18385# Atomic Energy Commission Washington D C
Div of Technical Information

PECULIARITIES OF EARLY REGENERATION OF MOUSE BONE MARROW IN VARIOUS VARIATIONS OF PARTIAL IRRADIATION

K A Fafanova et al *In its Radiobiol* Vol 8 No 2 1968 p 137-146 refs (See N69-18367 08-04)

Avail CFSTI

The early phase of restoration of the bone marrow of CBA mice after subtotal irradiation is characterized by a predominant activity of myelopoiesis and an extension of this response to the shielded portion of the hematogenic tissue. Here lies the essential distinction of this type of regeneration from regeneration after local irradiation where there is a local activation of erythropoiesis. Both in the case of subtotal and in the case of local irradiation the bone marrow lymphocytes respond to radiation damage and behave as a single system during regeneration regardless of whether they are in the irradiated or in the shielded portion. It was hypothesized that the cause of the inversion of hematogenesis in the case of subtotal irradiation is a decrease in the pool of bone marrow lymphocytes which perform the functions of pre-erythroid hematogenic cells; the direction of differentiation of the latter may be controlled by the spleen

Author

N69-18386# Atomic Energy Commission Washington D C
Div of Technical Information

POSTRADIATION TRANSPLANTATION OF THE BONE MARROW FROM TOLERANT DONORS

I N Golovistikov *In its Radiobiol* Vol 8 No 2 1968 p 147-157 refs (See N69-18367 08-04)

Avail CFSTI

A method of lowering the frequency and severity of secondary sickness of radiation chimeras by using bone marrow from mice or rats in which immunological tolerance to tissues of the donors was induced in the adult state as the donor material was approved. Transplantation of foreign bone marrow from donors in which tolerance to tissues of the future recipients was induced in the adult state lowers the frequency and severity of secondary disease of radiation chimeras. The effect is more pronounced in the allogenic model (C57BL → C3H) than in the xenogenic model (Wistar - C3H). A single preliminary immunization of the donors (Wistar rats C57BL mice) by spleen cells of the recipients (C3H mice) did not produce any significant changes in the expression of secondary sickness of radiation chimeras

Author

N69-18387# Atomic Energy Commission Washington D C
Div of Technical Information

INVESTIGATION OF STERILIZING DOSES FOR *EPHESTIA KUENNIELLA* L IN IRRADIATION IN VARIOUS STAGES OF DEVELOPMENT

N I Yusifov *In its Radiobiol* Vol 8, No 2 1968 p 158-164 refs (See N69-18367 08-04)

Avail CFSTI

Our investigation established the sterilizing doses of γ-radiation for various stages of development of *Ephestia kuennella* L. The lower radiosensitivity observed for the female at all stages of development gives a basis for assuming that it is associated with recovery processes occurring in the egg cell. A greater radiosensitivity of the fertilized egg cell was detected in comparison with the dormant germ cells before fertilization. In conclusion I should like to express my gratitude to Corresponding Member of the Academy of Sciences USSR A M Kuzin for his attention and valuable advice while this investigation was being conducted

Author

N69-18388# Atomic Energy Commission Washington D C
Div of Technical Information

BIOLOGICAL EFFECTS OF Po 210 IN THE CASE OF PERORAL ADMINISTRATION

Yu I Moskalev et al *In its Radiobiol* Vol 8 No 2 1968
p 165-176 refs (See N69-18367 08-04)

Avail CFSTI

In experiments on 386 female white rats we investigated the biological effects of polonium-210 in the case of peroral administration. The average lifetime of the rats, the changes in the blood picture, frequency and rates of appearance of mammary gland tumors were studied at doses of 0.01-2 $\mu\text{Ci/g}$ (total of seven doses). In the case of peroral administration polonium-210 is \approx 20 times less toxic than in the case of intraperitoneal injection. The changes in the composition of the white blood cells (leukopenia, neutrophilia and lymphocytopenia) depend chiefly upon the amount of the isotope introduced, while erythropenia also depends upon the lifetime of the experimental animals. In the long-term periods tumors of the mammary glands arise in the experimental rats considerably earlier and in a larger percentage of cases than among the control animals. Author

N69-18389# Atomic Energy Commission, Washington, D C
Div of Technical Information

FORMATION OF DEEP DOSES IN THE SKIN IN THE CASE OF ITS CONTAMINATION BY β - γ EMITTERS

V E Zaichik *In its Radiobiol* Vol 8 No 2 1968 p 177-186
refs (See N69-18367 08-04)

Avail CFSTI

Various models of infiltration of β -emitters into the skin were considered. A calculation of the distribution of dose rates according to depth of the skin was performed by the method of superpositions. The method consists of dividing the entire thickness of the skin into layers of 10-20 μ . For the corresponding scheme of penetration we determined the radioactivity present in each layer and assumed that this activity is distributed on a plane in the middle of this layer. The distribution of dose rates according to depth was determined from each layer on both sides according to the Levinger formula. Then the values of the dose rates from each layer at the same depth from the surface of the skin were summed. The results obtained permit an establishment of the possible variations of the dose rates at various depths of the skin arising as a result of infiltration of β -emitters with β -particle energies up to 3 MeV. Author

N69-18390# Atomic Energy Commission Washington D C
Div of Technical Information

DEPENDENCE OF THE DEVELOPMENT OF IRRADIATED SEEDS ON THE TEMPERATURE OF GERMINATION

L I Lebedeva et al *In its Radiobiol* Vol 8 No 2 1968
p 187-196 refs (See N69-18367 08-04)

Avail CFSTI

The relationship between the temperature and radiation effects is evidence of damage by penetrating radiation to the processes of metabolism controlling the integrity of the nuclear structures. Thus, according to the criterion of inhibition of the growth of rootlets in Indian mustard and peas that was used, the doses at which inactivation of such metabolic processes begins like the lethal doses differ by an order of magnitude. During postirradiation storage of white mustard seeds the value of the total injurious effect and the degree of radiation inhibition of recovery processes are reduced. In all probability such correlations are evidence of a relationship between the general radiosensitivity and the sensitivity of recovery processes to the radiation influence. Author

N69-18391# Atomic Energy Commission Washington, D C
Div of Technical Information

INFLUENCE OF THE FORM OF NITROGEN ON THE MANIFESTATION OF RADIOBIOLOGICAL EFFECTS AFTER TREATMENT OF SEEDS WITH FAST NEUTRONS

G V Ponomarev et al *In its Radiobiol* Vol 8, No 2 1968
p 197-202 refs (See N69-18367 08-04)

Avail CFSTI

The final radiobiological effects of treatment of seeds with fast fission neutrons can be modified by pre- and postirradiation growth on reduced or oxidized forms of nitrogen. The reduced form of nitrogen proved to be more advisable in practice for obtaining the maximum number of fertile M_1 plants. On the basis of our work it can be concluded that pre- and postirradiation growth of seeds on the reduced form of nitrogen decreases the negative effect of fast neutrons. Author

N69-18392# Atomic Energy Commission, Washington D C
Div of Technical Information

INFLUENCE OF X-RAY IRRADIATION ON PHAGOCYTOSIS OF AVIAN-TYPE TUBERCULOSIS MYCOBACTERIA, (EXPERIMENTAL INVESTIGATION ON THE MODEL OF BEE MOTH LARVAE)

G P Demakov et al *In its Radiobiol* Vol 8 No 2 1968
p 203-207 refs (See N69-18367 08-04)

Avail CFSTI

Bee moth larvae are a convenient model for studying the influence of x-ray irradiation in the phagocytosis of tuberculosis mycobacterium in the organism. Irradiation of the larvae at a dose of 50 R slightly inhibits the phase of absorption of mycobacteria but appreciably reduces the digestive ability of the hemolymph cells. Irradiation of bee moth larvae at a dose of 1000 R strongly inhibits both phases of phagocytosis—both absorption and decomposition of avian-type tuberculosis mycobacteria by the hemolymph cells. Author

N69-18393# Atomic Energy Commission Washington D C
Div of Technical Information

ON THE SIGNIFICANCE OF CORTICOSTEROIDS IN THE REALIZATION OF THE LYMPHOLYTIC EFFECT OF IONIZING RADIATION

V P Fedotov et al *In its Radiobiol* Vol 8 No 2 1968
p 208-214 refs (See N69-18367 08-04)

Avail CFSTI

The number of degenerating cells in the thymus, spleen and lymph nodes after irradiation of rats at a dose of 150 R or their administration of corticosteroids was determined by luminescent microscopy. It was found that the radiation lympholytic effect is made up of the direct injurious action of γ -rays and a mediated influence through the hormones of the adrenal cortex. A comparison of the lympholytic effect with the corticosterone level in the blood indicated that the mediated action of radiation is not necessarily associated with an activation of the adrenal cortex and may develop against a background of physiological concentrations of corticoids. However, the presence of hormones is quite essential since the damage to the lymphoid tissue is very slight in adrenalectomized animals. In the case of simultaneous application of irradiation and exogenous steroids a summation of the lympholytic effects is noted. Author

N69-18394# Atomic Energy Commission Washington D C
Div of Technical Information

FREQUENCY OF CHROMOSOME REARRANGEMENTS IN WHITE RATS DURING CHRONIC TREATMENT WITH CERIUM-144

R I Bikkulov *In its Radiobiol* Vol 8, No 2 1968 p 215-219
refs (See N69-18367 08-04)
Avail CFSTI

The frequency of chromosome rearrangements in germ and somatic cells of white rats was studied after chronic intake of cerium 144 over a period of 6 months. For each rat 250 cells from the testes, tibias and eyes were examined at the anaphase and telophase stages and the number of cells with chromosome damages were statistically evaluated. In all investigated cell tissues a regular increase in the frequency of chromosome rearrangements and a decrease in it after the administration had ceased were observed. G G

N69-18395# Atomic Energy Commission Washington D C
Div of Technical Information

INFLUENCE OF RADIOPROTECTORS ON THE PROCESSES OF BLOOD CLOTTING DURING ACUTE RADIATION SICKNESS IN GUINEA PIGS

O Ya Vorobev *In its Radiobiol* Vol 8 No 2 1968 p 220-226
refs (See N69-18367 08-04)
Avail CFSTI

The influence of the prophylactic administration of cystamine and mexamine on the processes of blood clotting was studied in experiments on guinea pigs. It was shown that in the development of the hemorrhagic syndrome of acute radiation sickness there are substantial disruptions in the entire system of hemostasis. However, both protectors influence chiefly the first phase of blood clotting. In acute radiation sickness in guinea pigs, the recalcification time is sharply disturbed. Cystamine and mexamine exert a protective action upon the recalcification time, moreover, mexamine is more active. In acute radiation sickness changes in the prothrombin index, the fibrinogen concentration and the fibrinolytic activity are observed. Author

N69-18396# Atomic Energy Commission, Washington D C
Div of Technical Information

RADIOSENSITIVITY OF CERTAIN SPECIES OF WOODY PLANTS UNDER THE CONDITIONS OF BELORUSSIA

M A Kudinov *In its Radiobiol* Vol 8 No 2 1968 p 227-230
refs (See N69-18367 08-04)
Avail CFSTI

Dormant woody plant seeds were irradiated at various doses by gamma rays at a dose rate of 100 R/sec and the results of germination were evaluated statistically. Results showed that seeds of certain radiosensitive species lost their ability to give viable offspring at a dose of 5 kR, whereas radioresistant species grew well at a dose of 60 kR. Greatest radioresistance was observed in plants of mountain localities. Comparison of obtained data confirmed the hypothesis that radiosensitivities depended upon the size of the chromosomes. G G

N69-18397# Atomic Energy Commission, Washington, D C
Div of Technical Information

CALCULATION OF DOSES ON THE INTESTINES IN SMALL LABORATORY ANIMALS

N A Zapol'skaya et al *In its Radiobiol* Vol 8 No 2 1968

p 231-235 refs (See N69-18367 08-04)
Avail CFSTI

Calculated were radiation absorption doses in intestine of white rats from oral administered cerium 144. The values for integrals of concentration with respect to time were found experimentally for rats under total starvation by graphically depicting the changes in activity in different portions of the gastrointestinal tract and by calculating the isotope concentration per gram mass of food in the various intestine sections. The absorbed dose depended upon the rate of passage of the isotope with the food, the fraction of activity that had been taken in, and the mass of contents in each portion of the gastrointestinal tract. G G

N69-18398# Atomic Energy Commission Washington D C
Div of Technical Information

PRACTICAL RESULTS OF SELECTIVE BREEDING OF COTTON OF THE SPECIES GOSS HIRSUTUM USING IONIZING RADIATION

M K K Gulamov et al *In its Radiobiol* Vol 8, No 2 1968
p 236-245 refs (See N69-18367 08-04)
Avail CFSTI

Positive mutations of the cotton plant of the species *Goss hirsutum* can be obtained under the influence of the γ -rays of ^{60}Co on the seeds. Useful cotton plants with a recessive mutation were obtained by irradiating the seeds at doses of 10-50 kR. The greatest mutagenesis was observed with respect to such characteristics and properties as early ripening, crude weight of one boll, fiber length, type of fruiting branches of the plants, and presence of linters on

the seeds. The yield of mutations increases when the seeds are additionally treated with high temperature (90°), which makes it possible to obtain mutants and at lower irradiation doses (1 kR). The deciding factor in the detection of recessive mutations is the second and third generations--M₂ and M₃. The appearance of new mutations differing from the original ones is also noted in the offspring of subsequent generations. Author

N69-18399# Atomic Energy Commission Washington D C
Div of Technical Information

A LARGE WELL-SHAPED SCINTILLATION DETECTOR

Yu F Koval et al *In its Radiobiol*, Vol 8 No 2 1968
p 246-248 refs (See N69-18367 08-04)
Avail CFSTI

Design and performance of a scintillation detector for metabolic studies of radioactive isotopes in animals is described. The instrument uses a scintillation plastic connected to a photocathode with a voltage detector and cathode repeater assembly for photoelectronic multiplier. A voltage of 1375 V was selected for measuring activities of standards and of animal organs. Radiometry of rats in vivo produced a recording efficiency with respect to cesium-137 of about 20 percent. G G

N69-18400# Atomic Energy Commission, Washington D C
Div of Technical Information

DOSE ACCUMULATION FACTORS CLOSE TO A RADIATION SOURCE FOR WATER AND TISSUE-EQUIVALENT SUBSTANCES

V E Drozdov et al *In its Radiobiol* Vol 8 No 2 1968
p 249-252 refs (See N69-18367 08-04)
Avail CFSTI

A simple expression with one exponential factor is developed

for calculating the radiation dose accumulation factor in water from a point isotopic source at 0.5 to 3 MeV energies and for 0 to 4 relaxation lengths thicknesses. The formula $B = Ae^{\alpha \mu R + (1-A)}$ expresses in α and A certain coefficients for the given energies and substances. μR is the source-detector distance in relaxation lengths ($\mu(\text{cm}^{-1})$ is the linear attenuation factor and R (cm) is the source-detector distance. An experimental verification of calculated accumulation factor values showed good agreement and did not exceed a discrepancy of ± 2.5 percent for Co^{60} radiation in water. G G

N69-18401# Atomic Energy Commission, Washington, D. C.
Div of Technical Information

BIOLOGICAL EFFECTS OF IRRADIATION OF VARIOUS INTENSITIES

I. G. Akoev et al. *In its Radiobiol.* Vol. 8, No. 2, 1968, p. 253-265 refs (See N69-18367 08-04)

Avail. CFSTI

We studied the clinical course of radiation sickness in dogs subjected to γ -irradiation of various intensities. Dose rates from 0.1 to 894 R/minute were used, or the dose was split into two to ten fractions. Special attention was paid to the clinical expression of the manifestations of the general primary response and the period of the height of the disease. Within the interval of dose rates studied, the average degree of injury decreased regularly with decreasing irradiation intensity. In the case of fractionated irradiation, the injurious effect of radiation increased with each fraction of irradiation up to a definite dose level. In the case of further irradiation, the manifestations of the primary responses were weakened or disappeared entirely. Author

N69-18402# Atomic Energy Commission, Washington, D. C.
Div of Technical Information

RADIOBIOLOGY, VOLUME 8, NUMBER 3

1968, 189 p, refs. Transl. into ENGLISH from *Radiobiologiya* (Moscow) v. 8, no. 3, 1968, p. 1-204.

(AEC-tr-696-Vol-8-No-3) Avail. CFSTI

Radiation effects in plants and animals and the use of antiradiation drugs are discussed in the articles presented. For individual titles see N69-18403 through N69-18425.

N69-18403# Atomic Energy Commission, Washington, D. C.
Div of Technical Information

SOME ASPECTS OF THE PROTECTION OF NUCLEOPROTEINS FROM THE INFLUENCE OF IONIZING RADIATION

A. N. Pisarevskii et al. *In its Radiobiol.* Vol. 8, No. 3, 1968, p. 1-11 refs (See N69-18402 08-04)

Avail. CFSTI

The comparative radiosensitivity of deoxyribonucleoprotein (DNP) was studied in the gel and condensed states. It was shown that the radioresistance of formed nucleoprotein strands is increased by one to two orders of magnitude. The introduction of a number of protective substances into a DNP gel leads to an increase in the critical dose leading to loss of the structure-forming properties. The best protective ability is possessed by AET and MPA and gallates. Irradiation of DNP gels by doses below the critical

does not lead to any change in the number of structuromechanical properties, if protective substances are introduced into the DNP gels before irradiation. FINAM has the greatest activity. In the irradiation of condensed DNP structures, the change in the relaxation properties is entirely suppressed when AET and MPA are introduced into solution. Stepwise deproteinization of DNP leads to an increase in the radioresistance of the nucleoprotein. It is hypothesized that the lysine-enriched fraction of histone is responsible for the change in the structuromechanical properties of the nucleoprotein complex. Author

N69-18404# Atomic Energy Commission, Washington, D. C.
Div of Technical Information

INFLUENCE OF IRRADIATION ON THE COMPOSITION OF MESSENGER RNA DURING LOACH EMBRYOGENESIS

S. R. Umanskii. *In its Radiobiol.* Vol. 8, No. 3, 1968, p. 12-22 refs (See N69-18402 18-04)

Avail. CFSTI

The population of RNA in normal and irradiated loach embryos was compared at various stages of development by the method of artificial DNA-RNA hybridization. It was shown that the activation of the new genes during early loach embryogenesis is accomplished periodically. The periods of activation of the genes coincide with the periods of morphogenetic activity of the nuclei. Irradiation before the beginning of gene activation almost entirely suppresses this process at the same time without producing a repression of already active genes. Author

N69-18405# Atomic Energy Commission, Washington, D. C.
Div of Technical Information

URINE PROTEINS DURING ACUTE RADIATION SICKNESS OF ANIMALS

G. A. Zedgenidze et al. *In its Radiobiol.* Vol. 8, No. 3, 1968, p. 23-33 refs (See N69-18402 08-04)

Avail. CFSTI

The urine proteins of intact rats of the Avgust line and animals subjected to whole-body irradiation by the γ -rays of ^{60}Co , were subjected to an electro- and immunoelectrophoretic investigation. Cross-exhausted and unexhausted rabbit immune sera against uroproteins of intact and irradiated animals as well as against proteins of the blood, mitochondria, microsomes and hyaloplasm of kidney cells were used to develop the electrophoretograms. In the uroproteins of the intact rats, six fractions differing in electrophoretic mobility were detected, containing 11 antigens, five of which were represented by blood serum proteins while six were uroproteins specific for the urine, also determined in the proteins of the hyaloplasm and microsomes of kidney cells. Radiation sickness of the animals is accompanied by phase changes in the kidney function. An increased excretion of protein with the urine is observed at the early stage of radiation sickness and during the height of the disease in cases of autoinfectious complications. Author

N69-18406# Atomic Energy Commission, Washington, D. C.
Div of Technical Information

INFLUENCE OF GALASCORBIN ON THE RESPIRATION AND OXIDATIVE PHOSPHORYLATION OF LIVER MITOCHONDRIA AFTER IRRADIATION OF ANIMALS

E. F. Shamrai et al. *In its Radiobiol.* Vol. 8, No. 3, 1968, p. 34-38 refs (See N69-18402 08-04)

Avail. CFSTI

In radiation sickness, disturbances of the intracellular metabolism are observed, including the energy metabolism. Iyngq at

the basis of all the vital processes. The question of the influence of ionizing radiation upon the processes of tissue metabolism and oxidative phosphorylation has been insufficiently studied. In this study the indices of the energy metabolism were determined after various types of irradiation (local and total) and various doses (sublethal and lethal). Also determined was the possibility of influencing these processes by the use of a physiological complex of vitamins C and P, galascorbin. Author

N69-18407# Atomic Energy Commission, Washington, D. C. Div. of Technical Information
POSTRADIATION CHANGES OF MOUSE AND RAT BONE MARROW CELLS DURING INCUBATION IN VITRO
 L. A. Kharlamova. *In its Radiobiol.* Vol. 8, No. 3, 1968, refs. p. 39-46, refs. (See N69-18402 08-04)
 Avail. CFSTI

The dynamics of the inactivation, death, and lysis of bone marrow cells were studied in nonirradiated and irradiated suspensions incubated at 37° *in vitro*. The dynamics of inactivation (loss of ability for unlimited multiplication) of hematogenic stem cells in mouse bone marrow suspensions were determined by the method of spleen colonies. Death and lysis of nucleated cells was judged according to the decrease in the number of cells that were not stained by eosin and were not lysed. It was established that the kinetic principles of these processes are the same. Irradiation at a dose of 100 and 190 R led to an acceleration of the inactivation of those stem cells which retained their ability for unlimited division immediately after irradiation. An acceleration of the processes of death and lysis of nucleated cells *in vitro* was observed only in the case of irradiation at doses of 1000 R and more. Author

N69-18408# Atomic Energy Commission, Washington, D. C. Div. of Technical Information
STUDY OF THE DIRECT AND REMOTE EFFECTS OF RADIATION ON BONE MARROW
 A. L. Vygoskaya et al. *In its Radiobiol.* Vol. 8, No. 3, 1968, p. 47-59, refs. (See N69-18402 08-04)
 Avail. CFSTI

Cell destruction and the change in the number of cells of different fractions in rat bone marrow under the influence of direct and remote action of radiation during the first two days after irradiation at a dose of 1000 R with one limb shielded were studied. The existence of remote influences of radiation upon hematogenic tissue manifested in a substantial cell destruction in the shielded bone marrow was established. It was shown that the remote effect is due to a sharp decrease in the number of erythroid cells and a certain decrease in the number of myeloid cells. The number of lymphocytes in the shielded bone marrow does not change significantly. The causes of the drop in the number of cells of different fractions of the shielded and irradiated bone marrow are analyzed. A substantial change in the quantitative and qualitative composition of the bone marrow was detected under the action of nonspecific stress influences, manifested in a redistribution of cells between the bone marrow and blood during the early periods after the influence. Author

N69-18409# Atomic Energy Commission, Washington, D. C. Div. of Technical Information
COMPARATIVE STUDY OF THE EFFECTS OF X-RAY AND GAMMA-RADIATION ON THE SURVIVAL OF RATS UNDER CONDITIONS OF NONUNIFORM INFLUENCES
 G. M. Avetisov. *In its Radiobiol.* Vol. 8, No. 3, 1968, p. 60-65, refs. (See N69-18402 08-04)

Avail. CFSTI

The peculiarities of the biological effects of X-ray and γ -radiations were demonstrated. A consideration of the spatial distribution of the tissue doses makes it possible to explain the qualitative and quantitative peculiarities of the course of radiation injury in nonuniform fields. In a comparison of the biological effectiveness of different types of radiations, a strict consideration of the spatial distribution of doses is needed. The radiobiological effect of the γ -radiation of ^{60}Co in comparison with X-rays ($\Delta = 1.31 \text{ mm Cu}$) according to the criterion $\text{LD}_{50/30}$ is equal to 1. Author

N69-18410# Atomic Energy Commission, Washington, D. C. Div. of Technical Information
RECOVERY OF FETUS AND PLACENTA AFTER RADIATION INFLUENCE
 V. E. Kogan. *In its Radiobiol.* Vol. 8, No. 3, 1968, p. 66-74, refs. (See N69-18402 08-04)
 Avail. CFSTI

The change in the state of fetuses and placentas was studied 3-7-9 days after irradiation of female rats on the tenth day of pregnancy at a dose of 25 R (on the 13th, 17th and 19th days of pregnancy). It was shown that on the 13th day of pregnancy the vascularization of the fetal placenta is reduced and the lifetime of the fetuses under conditions of total oxygen starvation is shortened (69.7 min in the experimental group, compared with 104.9 min in the control). Subsequently a gradual repair of the vascular disorders in the placenta is observed by the 17th day of pregnancy; no underdevelopment of the fetal vascular network in the labyrinth portion of the irradiated placentas is detected. Normalization of the response of the fetuses to total oxygen starvation does not set in until the 19th day of pregnancy. Thus together with high radiation vulnerability of the fetus a substantial ability for repair is detected. Author

N69-18411# Atomic Energy Commission, Washington, D. C. Div. of Technical Information
RADIOSENSITIVITY OF DEVELOPING TENCH EMBRYOS (TINCA TINCA L.)
 I. V. Kulikov et al. *In its Radiobiol.* Vol. 8, No. 3, 1968, p. 75-81, refs. (See N69-18402 08-04)
 Avail. CFSTI

The effects of aqueous solutions of ^{90}Sr - ^{90}Y and external irradiation by the γ -rays of cobalt-60 on the embryonic development of the tench were studied. Incubation of fertilized tench roe in aqueous solutions of ^{90}Sr - ^{90}Y with a concentration from 10^{-10} to 10^{-5} curie/liter has no appreciable effect on the rate of development of the embryos or on quantitative yield of normal and abnormal prelarvae. The survival rate of the prelarvae for ten days after hatching from the roe incubated in radioactive water does not differ from the control. The prelarvae that hatched from the roe incubated in radioactive solutions proved to be just as resistant to supplementary external γ -irradiation (dose 800 R) as the controls. A single external γ -irradiation of the roe at the stage of early cleavage increases the yield of anomalous prelarvae at a dose of 50 R; the total yield of prelarvae, however, is unchanged in comparison with the control up to 200 R. A dose of 400 R is absolutely lethal. The prelarvae hatched from the roe subjected to irradiation of 200 R subsequently died considerably more rapidly than in the control. Doses from 25 to 100 R did not produce any appreciable deviations. Author

N69-18412# Atomic Energy Commission Washington D C
Div of Technical Information

RADIOSENSITIVITY OF THE MEMBRANES OF ISOLATED NUCLEI OF NERVE AND GLIAL CELLS

K Sh Nadareishvili et al *In its Radiobiol* Vol 8, No 3 1968
p 82-91 refs (See N69-18402 08-04)

Avail CFSTI

The kinetics of the hypotonic and alkaline decomposition of isolated nuclei obtained from the brains of four-week-old rats were studied. The nuclei were isolated by the method of Shobo with modifications. A suspension of nuclei in an isotonic sucrose solution was irradiated at 15-2°C diluted with 0.25% neutral or alkaline NaCl solution and analyzed at room temperature. The nuclei in suspension were counted microscopically and with an electronic particle counter. A statistically significant radiation effect is detected at 500 R for nuclei of astrocytes and at 1000 R for the nuclei of neurons and oligodendrocytes. The rate of hypotonic and alkaline lysis of nuclei increases almost up to 30 kR. At a dose of 40 kR or more, the effect of irradiation is reduced, i.e., the osmotic stability of the nuclear membranes increases sharply. With all other conditions equal, the nuclei of the astrocytic glia are more sensitive to irradiation than the nuclei of the neurons and oligodendrocytes, which should be due to the higher functional and metabolic activity.

Author

N69-18413# Atomic Energy Commission Washington D C
Div of Technical Information

PHYSIOLOGICAL ANALYSIS OF THE ROLE OF SYNAPSE DISTURBANCES OF THE ACTIVITY OF THE NEUROMUSCULAR APPARATUS AFTER IRRADIATION

A E Ulyanitskaya *In its Radiobiol* Vol 8 No 3 1968
p 92-98 refs (See N69-18402 08-04)

Avail CFSTI

In irradiation of a neuromuscular preparation of *m. sartorius* in *ischiodiscus* of the frog at a dose of 18-20 krad, a distinct decrease in the work capacity of the muscle begins detectable according to its contraction in response to stimulation of a motor nerve. At the same time, in the case of direct stimulation, the work capacity of the muscle does not differ from the norm. A dose of 18-20 krad does not produce any changes either in the threshold of excitation or in the action potential of the nerve. The action potentials of the muscle in the case of stimulation of a motor nerve become lower than in the control, while in the case of direct stimulation of the muscle they are higher. Producing an initial deterioration of the work of the muscle in response to stimulation of a motor nerve, such a dose does not lower the work capacity either of the motor nerve or of the excitable muscle membrane. Consequently, a disruption of the myoneural synaptic transmission is responsible for the primary injurious effect observed immediately after irradiation.

Author

N69-18414# Atomic Energy Commission Washington D C
Div of Technical Information

SOME DISPUTED QUESTIONS IN THE PROBLEM OF POSTIRRADIATION RECOVERY OF THE CHROMOSOMES

N V Luchnik *In its Radiobiol* Vol 8 No 3 1968 p 99-111
refs (See N69-18402 08-04)

Avail CFSTI

In this article the term recovery is used to denote nonrealization of latent damages, here limited to the cytogenetic level. Evidence is cited against the idea that the formation of observable chromosome aberrations is based upon true breaks. Most of the facts support the correctness of the template theory. The impossibility without making more or less arbitrary assumptions of

determining the rate of recovery and time of realization using existing facilities was demonstrated. The results of experiments indicating that cellular and local recovery involves processes that occur at the presynthetic and synthetic stages of the cellular cycle, respectively, were analyzed. Possible molecular mechanisms of both types of recovery are discussed.

Author

N69-18415# Atomic Energy Commission, Washington D C
Div of Technical Information

LUMINESCENCE-CYTOCHEMICAL INVESTIGATION OF THE EFFECTS OF GAMMA-RAYS AND RADIOTOXINS ON CELLS OF EHRlich ASCITES CARCINOMA

V G Kondratenko et al *In its Radiobiol* Vol 8 No 3 p 112-121
refs (See N69-18402 08-04)

Avail CFSTI

The effects of γ -rays and quinoid radiotoxins on Ehrlich cancer cells were studied. Using a cytofluorimetric method, it was shown that in the development of radiation damage to cellular nuclei, there is an almost complete analogy both under the action of ionizing radiation and under the action of radiotoxins. It was established that there is a dose and time dependence, and in the case of the action of radiotoxins, a concentration dependence as well, in the development of radiation reactions in the DNA-protein complex of the nuclei. The effects of radiation anabolites upon cellular nuclei begin to be manifested practically simultaneously with the effects of radiation. It is concluded that the role of a starter mechanism is played by the action of the ionizing rays, and an important role is played by the effects of radiation anabolites.

Author

N69-18416# Atomic Energy Commission Washington D C
Div of Technical Information

ELECTROLYTE COMPOSITION OF THE BLOOD PLASMA AND LIQUOR IN RABBITS IRRADIATED AFTER PROPHYLACTIC ADMINISTRATION OF CYSTAMINE

A G Kuzovkov et al *In its Radiobiol* Vol 8 No 3 1968
p 122-127 refs (See N69-18402 08-04)

Avail CFSTI

The content of sodium, potassium, and calcium ions in the spinomedullary fluid and in the blood plasma taken from the carotid artery and medullar venous sinus was studied in experiments on rabbits by the method of flame photometry. The indices of the calcium content reflect the total value of ionized and bound calcium. Irradiation of the animals is accompanied by pronounced hypokalemia and a slightly increased sodium level. Cystamine administered before irradiation normalizes the potassium metabolism in the animal organism after irradiation and somewhat increases the sodium and calcium ion content in the blood in this case.

Author

N69-18417# Atomic Energy Commission Washington D C
Div of Technical Information

RELATIONSHIP BETWEEN THE FLUORINE AND CALCIUM CONTENTS IN THE DIET AND THE RESISTANCE OF ANIMALS TO THE INFLUENCE OF GAMMA-IRRADIATION

V A Knizhnikov et al *In its Radiobiol* Vol 8 No 3 p 128-134
refs (See N69-18402 08-04)

Avail CFSTI

The significance of the level of intake of calcium and the trace element fluorine with the diet for the radioresistance of animals to single and fractionated whole-body α irradiation was studied in chronic experiments on 312 noninbred white rats. It was established that a diet enriched in calcium and fluorine substantially increases the radioresistance of the animals.

Author

N69-18418# Atomic Energy Commission Washington D C
Div of Technical Information
**EXPERIMENTAL STUDY OF THE EFFECTIVENESS OF
CYSTAMINE IN CASE OF PROLONGED INFLUENCE OF
GAMMA-RAYS ON RATS**
D I Zelyakova *In its Radiobiol* Vol 8 No 3 1968 p 135-139
refs (See N69-18402 08-04)
Avail CFSTI

The radioprotective action of cystamine and that of cystamine with amygdalin in various doses and courses of administration at a dose rate of 16.7 R/hour up to a total dose of 2000 R was studied on 140 rats. The indicated dose produces 80-100% death of the animals within a 30-day period. The administration of the preparations before the beginning of irradiation and repeated administration during irradiation at a daily dose of 150 mg/kg are ineffective. Repeated administration in a daily dose of 450 mg/kg has a pronounced toxic effect. The causes of the ineffectiveness of cystamine under conditions of the irradiation model were studied.
Author

N69-18419# Atomic Energy Commission Washington D C
Div of Technical Information
**RESTORATION OF RADIATION DAMAGES TO COTTON
SEEDS DURING PROLONGED STORAGE**
N M Berezina et al *In its Radiobiol* Vol 8 No 3 1968
p 140-145 refs (See N69-18402 08-04)
Avail CFSTI

It was established that cotton seeds irradiated at the lethal dose of 40 kR show a restoration of viability when they are stored for prolonged periods under laboratory conditions. All the seeds freshly irradiated at this dose die in the stage of the cotyledon leaves. Seeds stored for 6 and 12 months after irradiation develop true leaves, buds and bloom. The restoration of viability is paralleled by a restoration of a whole series of physiological and biochemical disorders, arising in the freshly irradiated seeds: the chlorophyll content is restored, as is the activity of oxidative enzymes, and the content of radiotoxins is reduced.
Author

N69-18420# Atomic Energy Commission, Washington, D C
Div of Technical Information
**JOINT ACTION OF GAMMA-IRRADIATION AND THERMAL
SHOCKS ON A *ARABIDOPSIS THALIANA* (L) HEYNH SEEDS**
Ch V Nikolov et al *In its Radiobiol* Vol 8 No 3 1968
p 146-153 refs (See N69-18402 08-04)
Avail CFSTI

Air-dried seeds were subjected to γ -irradiation at doses of 40, 80, 120 and 160 kR as well as to a temperature of 100°C for 30 minutes. Thermal shocks were applied before, after or before and after irradiation. In the control and experimental groups of plants, death of the plants in the phases of the cotyledons and rosette growth of the root and stem, the rate of passage through the basic phases of development and fertility were studied. Postirradiation thermal shocks intensified the effects of irradiation, while preradiation and double shocks weakened them. The possible mechanisms of the influence of thermal shocks upon the radiobiological responses of seeds are discussed.
Author

N69-18421# Atomic Energy Commission, Washington D C
Div of Technical Information
**INFLUENCE OF TRACE ELEMENTS ON THE SENSITIVITY
OF SEEDS TO FAST FISSION NEUTRONS**
G V Ponomarev *In its Radiobiol* Vol 8 No 3 1968
p 154-160 refs (See N69-18402 08-04)
Avail CFSTI

Within the range of fast fission neutron tissue doses up to 600 rad, no changes could be established in the radiosensitivity of barley seeds preliminarily germinated on a medium with an increased amount of boron. Preliminary germination on a medium with an increased amount of zinc increases the resistance of the seeds to fast fission neutrons. Preliminary germination against a background of polyvalent cations (Fe, Mn, Co) increased the sensitivity of the seeds to fast fission neutrons. A relationship was noted between the increase in the radiosensitivity of the seeds and the maximum valence of the metal ions.
Author

N69-18422# Atomic Energy Commission, Washington, D C
Div of Technical Information
**USE OF THE "STEBEL" GAMMA-APPARATUS IN
EXPERIMENTAL RADIOBIOLOGY**
T G Ratner et al *In its Radiobiol* Vol 8 No 3 1968
p 161-166 refs (See N69-18402 08-04)
Avail CFSTI

The dose distribution within the working chamber of the "Stebel" apparatus was studied with a radioactive charge of ^{137}Cs , which broadens the possibility of utilizing it in radiobiological experiments where it is necessary to know the exact dose distribution over the volume being irradiated. The dose distribution was measured in air and a tissue equivalent phantom by chemical dosimetry. The dose rate in the center of the chamber can be varied from 750 to 100 rad/minute with the aid of inserted lead shields. By considering the parameters studied, good reproducible conditions of irradiation and accuracy of dosimetry can be ensured.
Author

N69-18423# Atomic Energy Commission Washington D C
Div of Technical Information
MUTAGENIC EFFECTS OF RADIOTOXINS
A M Kuzin et al *In its Radiobiol* Vol 8, No 3 1968
p 167-170 refs (See N69-18402 08-04)
Avail CFSTI

The investigation indicated that quinoid radiotoxins extracted from γ -irradiated plant tissue, acting upon *E. coli* K-12 (λ), induced the formation of auxotrophic mutants. With the procedure used, 12 mutants were formed on 1000 investigated colonies, as compared with 0.6 in the control. The mutants obtained required proline and serine, alanine and glycine, serine and xanthine, leucine, leucine, valine and roline, tryptophan. A large frequency of appearance of proline deficiency was noted (8 out of 16).
Author

N69-18424# Atomic Energy Commission Washington D C
Div of Technical Information
**ON THE ROLE OF ADRENAL CORTEX IN THE MECHANISM
OF THE RADIOPROTECTIVE ACTION OF TESTOSTERONE**
B B Moroz et al *In its Radiobiol* Vol 8 No 3 1968
p 171-175 refs (See N69-18402 08-04)
Avail CFSTI

The change in the corticosterone content in the blood plasma and in the tissues of the adrenals was investigated in intact and irradiated rats under conditions of protection with testosterone propionate. A single administration of testosterone three or ten days before irradiation prevents an increase in the corticosterone level in the height of radiation sickness, exerts a radioprotective effect, and makes the course of the disease lighter. The mechanism of the protective action of testosterone is associated with a change in the function of the adrenal cortex during radiation sickness.
Author

N69-18425# Atomic Energy Commission Washington D C
Div of Technical Information

RADIOACTIVITY OF THE RINGED SEAL

N V Sokolova et al *In its Radiobiol* Vol 8 No 3 1968
p 176-179 refs (See N69-18402 08-04)
Avail CFSTI

This work present presents data on the strontium 90 and cesium 137 content in various organs and tissues of the ringed seal *Pusa hispida ochotensis* Pall from Sea of Okhotsk in 1966 The strontium 90 concentrations in the bones of the seal were 13-28 pCi/kg of crude weight, in the muscles 0.6-1.5 and in the liver 1.1-1.4 The γ radiation of the seal organs and tissues was due chiefly to potassium 40 and cesium 137 Author

N69-18489# California Univ Davis Dept of Human Physiology

MUSCLE TRAINING AND BLOOD FLOW

Masahiro Kaneko R F Walters, and L D Carlson 15 Jan 1969
298 p refs
(Grant NGR-05-004-026)
(NASA-CR-99770) Avail CFSTI CSCL 06S

Nine male subjects ranging in ages from 18 to 21 years participated in isometric or isotonic training conducted to determine the effects on blood flow and other performance characteristics of the circulatory system, such as venous compliance Muscle changes were induced by three weeks of exercises following isometric training schedules The isotonic training was adjusted to comparable levels The muscle strength before and after conditioning was determined by characterization of circumference, maximum tension, maximum tension endurance and force velocity The effect of muscle conditioning on the muscle circulation was characterized by measurements of the resting blood flow, blood flow following arterial occlusion, after isometric exercises and after isotonic exercises Extensive numerical results are presented in tables and graphs K W

N69-18490# Minnesota Univ Minneapolis Space Science Center

ENVIRONMENTAL MICROBIOLOGY AS RELATED TO PLANETARY QUARANTINE Semiannual Progress Report

Dec 1968 69 p ref
(Grant NGL-24-005-160)

(NASA-CR-99761 SAPR-1) Avail CFSTI CSCL 06M

Progress in five research projects is summarized in this report Four of the projects are concerned with behavior and survival of the *Bacillus subtilis* var *niger* spores the last project deals with the detection of low levels of microbial contamination on surfaces by chemical methods and determination of the relative percentages of living and dead cells The behavior and survival of the spores was experimentally studied at temperatures below 60°C, in controlled air flow, and under conditions of heat-fixing at 80°C The effects of humidity, location, surface finish and separator thickness on the heat destruction of the spores when located between mated surfaces were also investigated Experimental procedures, equipment and results are presented for each study K W

N69-18566 New York Univ N Y

SCANNING FUNCTION OF DISTANCE-ACUITY AND ARRAY STRUCTURE

Robert Fudin (Ph D Thesis) 1967 148 p
Avail Univ Microfilms HC \$7.00/Microfilm \$3.00 Order No 68-10058

Identical alphabetical material tachistoscopically presented in the right visual field (RVF) and left visual field (LVF), successively

are more easily recognized in the RVF Targets are presented in the two fields such that the distance between target center and the fixation point (FP) are equated This finding has been used in support of Hebb's notion of a cell assembly In reading English the next words to be encoded are usually to the right (in the RVF) As a result of this selective visual attention process, highly developed cell assemblies are established which mediate recognition of material exposed in the RVF more efficiently When a word is exposed in the RVF (1) its SP is easier to detect because it falls on an area of greater visual acuity (2) the scanning process reaches the SP with less delay since it is located closer to the FP and (3) the first half of the word the more important part for total word recognition falls on an area of greater visual acuity These advantages allow scanning of the after-stimulation of these arrays to start with less delay This factor is critical because the after-stimulation is rapidly losing its potential information Dissert Abstr

N69-18567 Iowa Univ Iowa City

UNIT RESPONSES OF THE CAT COCHLEAR NUCLEUS TO AMPLITUDE-MODULATED STIMULI

Theodore Joseph Glatke (Ph D Thesis) 1968 164 p
Avail Univ Microfilms HC \$7.60/Microfilm \$3.00 Order No 68-10654

Two populations of units were defined on the basis of their spectral sensitivity Low-frequency units were considered to be those with characteristic frequencies (CFs) of 800 Hz or less and high-frequency units were those with CFs higher than 800 Hz In the case of low-frequency units stimuli were presented with low-frequency periodicity but with spectra controlled to minimize low-frequency energy High-frequency units were provided with stimuli consisting of the CF of each modulated at rates of 1000 interruptions per second Tuning curves for the modulated stimuli were derived for both low-frequency and high-frequency units In addition some units were studied using modulated noise stimuli Dissert Abstr

N69-18668# Naval Radiological Defense Lab San Francisco Calif

HEMATOLOGICAL RESPONSE IN SHEEP GIVEN PROTRACTED EXPOSURES TO Co 60 GAMMA RADIATION

E T Still, S T Taketa, E J Ainsworth, G F Leong and J F Taylor [13 Feb 1969] 17 p refs
(NASA Order A-94806)

(NASA-CR-73286) Avail CFSTI CSCL 06R

The changes in the total leukocytes in sheep irradiated with ⁶⁰Co gamma at a rate of 1.9 R/hr have been determined After 50 R total exposure maximum depression occurred 24 hours later After 100 R or 175 R maximum depression occurred within one hour Recovery to control values was seen by 8-9 days for all three exposure groups The recovery pattern for the circulating leukocytes was qualitatively the same for each of the three groups An early lymphopenia was seen in all the groups with recovery to the normal by 5-8 days The percentage of neutrophils was greatly increased during the first 5 days The data indicate that total leukocyte counts may not be a reliable means of predicting the exposure an animal sustains under protracted irradiation conditions Author

N69-18680 Arkansas Univ Fayetteville
STUDIES ON THE RADIATION RESPONSE OF L CELLS UNDER ENERGY DEPRIVATION

James Lynn Sanders (Ph D Thesis) 1968 91 p
 Avail Univ Microfilms HC \$4 80/Microfilm \$3 00 Order No 68-9619

Cultured mammalian cells of the L type show a brief accelerated uptake of radioactive precursor into both deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) following relatively low doses of 250 kVp X-rays This response appeared for cells being starved in a glucose-free salt solution and for cells treated with a 2 4-dinitrophenol Three distinct features characterize the response First a relatively fixed postirradiation time delay seems necessary before the accelerated labeling of the nucleic acids occurs Second the labeling of of DNA fraction closely parallels the labeling of the RNA fraction Finally the radioactive label appears to enter and then to leave both nucleic acid fractions Survival studies indicated that cells treated with 2 4-dinitrophenol had an increased resistance to X-rays Consequently the radiation-induced nucleic acid synthesis may represent a cellular mechanism for recovery from radiation injury
 Dissert Abstr

N69-18681 Wisconsin Univ Madison
A CYBERNETIC ANALYSIS OF VISUAL FEEDBACK DELAY AND INTERMITTENCY IN HUMAN TRACKING PERFORMANCE

Henry Shang-Ren Kao (Ph D Thesis) 1968 155 p
 Avail Univ Microfilms HC \$7 20/Microfilm \$3 00 Order No 68-7107

This research was conducted to test a real-time feedback theory of tracking and to evaluate the traditional stimulus-response conditioning concept of optimal intermittency in human motor response regulation The research assumptions stated that temporal factors of delay and intermittency contrary to traditional view would interfere with tracking performance at variable degrees It was also assumed that it would not be possible to establish optimal conditions of intermittency in stimulus regulation other than continuous control Three studies were conducted The first study compared the effects of feedback delay and intermittency on tracking under identical magnitudes as separate univariate factors The second study concentrated on the multivariate interaction of both delay and intermittency in tracking The third study examined the conditions of visual feedback persistence and non-persistence in tracking in relation to delay and intermittency
 Dissert Abstr

N69-18722*# Bolt Beranek and Newman Inc Van Nuys Calif
COMBINATION EFFECTS OF TONE AND DURATION PARAMETERS ON PERCEIVED NOISINESS

Karl S Pearsons Washington NASA Feb 1969 49 p refs
 (Contract NAS1-7461)
 (NASA-CR-1283) Avail CFSTI CSCL 06P

Three series of judgment tests were conducted to investigate the effects on perceived noisiness of tone content and duration parameters Time patterns for the stimuli employed in the tests were triangular in shape to simulate aircraft flyover time histories Stimuli for the first test included durations of 4 12 and 32 seconds measured 10 dB below the maximum level of the stimulus Tone-to-noise ratios in 1/3 octave bands for the stimuli at 2000 and 4000 Hz were varied to include 10 and 25 dB and no tone In the second test stimuli included recordings of test stand turbofan engine noise using the same time history shape and durations mentioned above The third test utilized pure-tone and broadband noise spectra like those used in the first Test however the duration of the tone differed from the duration of the noise and the maximum level of the tone did not always occur at the same point in time as the maximum level of the noise
 Author

N69-18755*# Lockheed Missiles and Space Co Sunnyvale Calif
 Biotechnology Organization

DEVELOPMENT AND DESIGN OF AN ISOTOPE-HEATED CATALYTIC OXIDIZER TRACE CONTAMINANT CONTROL SYSTEM

Thomas M Olcott 28 Feb 1969 178 p refs
 (Contract NAS1-7433)
 (NASA-CR-66739) Avail CFSTI CSCL 06K

The contaminant load and data from recent manned simulator tests and outgassing and degradation studies of materials were reviewed to develop a contaminant load for the pre- and post-sorbent beds The contaminants selected were those contaminants known to be potentially poisonous to catalyst activity and those contaminants that might decompose and be oxidized to harmful products The detailed design of the isotope heated catalytic oxidizer system included a stress analysis of the main structure and a review of the thermal characteristics Following this detailed design drawings for the entire system were prepared The resistively heated unit is insofar as possible an exact duplicate of the radioisotope - fueled unit except that the thermal power is obtained from a resistively heated element located in the fuel cavity and heater element and thermocouple leads pass through the heat exchanger core
 Author

N69-18767# National Physical Lab Teddington (England) Div of Computer Science

SUBJECTIVE CHANGES IN THE PERCEPTION OF CONSONANTS WHEN PRESENTED AS 'STABILISED AUDITORY IMAGES'

C R Evans and Jacqueline Wilson Nov 1968 9 p refs
 (COM-SCI-41) Avail CFSTI

When a single consonant is repeated continuously through earphones connected to an endless loop tape for ten minutes many subjects begin to hear other consonants As the first phantom word chosen is often the aspirant H further experiments using nonsense words are planned
 ESRO

N69-18991*# Albert Einstein Coll of Medicine New York
SENSORY, PERCEPTUAL, AND PHYSIOLOGICAL ASPECTS OF SENSORY DEPRIVATION

Sidney Weinstein In Va Polytech Inst Proc of the Conf on the Role of Simulation in Space Technol Pt D [1965] 25 p refs
 (See N69-18988 08-11)
 (Grant NSG-489)
 Avail CFSTI CSCL 06S

The effects of sensory deprivation and their implication for space travel are discussed including spatial disorientation the autokinetic effect and size constancy Research in sensory deprivation on man and animals and some of the usual techniques employed, are described Chemical studies and the effects of drugs are briefly mentioned Sources and characteristics of stimuli are defined Some of the aspects of a research program and the categories of sensory change which an astronaut might undergo in his capsule or an experimental subject in his cubicle are outlined
 K W

N69-18992*# National Aeronautics and Space Administration
Washington D C

EFFECT OF LOW-GRAVITY ON PHYSIOLOGICAL PROCESSES

Siegfried J Gerathwohl *In Va Polytech Inst Proc of the Conf on the Role of Simulation in Space Technol Pt D [1965] 36 p refs (See N69-18988 08-11)*

Avail CFSTI CSCL06S

The major problems involved in low-gravity experimentation are discussed and available data on the effects of prolonged weightlessness are summarized. The effects of weightlessness on physiological functions during or after orbital flights are discussed in some detail based on results from flights conducted by the United States and the USSR. Personal experiences of the astronauts, operational performance, sensory and neurophysiological functions, respiratory functions, cardiovascular functions, the general metabolism, energy, physical strength, and reentry stress tolerances are specifically discussed. The results indicate that certain neurophysiological and physiological functions of the astronauts and cosmonauts were affected by the zero-G conditions but no changes in their health were noted during flight. The symptoms observed in postflight examinations are also discussed.

K W

N69-18993*# Naval Air Development Center Johnsville Pa
EFFECTS OF HIGH-GRAVITY ON PHYSIOLOGICAL PERFORMANCE

Randall M Chambers *In Va Polytech Inst Proc of the Conf on the Role of Simulation in Space Technol Pt D [1965] 71 p refs (See N69-18988 08-11)*

Avail CFSTI CSCL06S

The effects of high gravity on the physiological and psychological performance capabilities of man are summarized and some of the major simulation studies which have concentrated on these aspects are reviewed. The emphasis is on specific data pertaining directly to manned spacecraft systems under development and test, although some simulation studies which have attempted to provide specific information in support of projects Mercury, Dyna-Soar, Gemini, and Apollo are also mentioned. The material is limited to problems involving high sustained linear accelerations. Acceleration environments and their effects on the psychophysiological performance of human subjects are discussed and astronaut acceleration training programs and space flight simulations are summarized. In conclusion, 17 general principles are presented which describe the effects of high gravity on man. Future research needs are indicated.

K W

N69-18994*# Republic Aviation Corp Farmingdale N Y
CLOSED ATMOSPHERES

George A Albright *In Va Polytech Inst Proc of the Conf on the Role of Simulation in Space Technol Pt D [1965] 64 p refs (See N69-18988 08-11)*

Avail CFSTI CSCL14B

The physiological and engineering problems associated with a closed environment and the life support system design requirements for future manned space systems are discussed. The role of simulation in determining man's physiological tolerance in developing, testing, and qualifying a life support system and subsystems and in establishing that man can survive and perform as man-machine integrator of the manned space system is briefly pointed out. Specifically covered are facility requirements, emergency recompression incidents, selection of atmospheres, oxygen toxicity, the Gemini atmosphere validation program, inert gases, atmosphere contaminants, and future life support systems.

K W

N69-19007 Columbia Univ, New York

STUDIES OF THE RIBONUCLEOPROTEIN PARTICLES IN RELAXED MUTANTS OF ESCHERICHIA COLI

Sawsan Amin Nofal (Ph D Thesis) 1967 82 p

Avail Univ Microfilms HC \$4.40/Microfilm \$3.00 Order No 68-8605

The presence of enzymes which methylate ribosomal RNA has been demonstrated. These methylating enzymes are ubiquitous and species specific. *In vivo* methylation of the ribonucleoprotein particles formed during methionine starvation of *E. coli* K₁₂W6 was also studied. Methylation of these particles occurs before they rearrange to normal ribosomes.

Dissert Abstr

N69-19023*# National Aeronautics and Space Administration
Washington, D C

AEROSPACE MEDICINE AND BIOLOGY A CONTINUING BIBLIOGRAPHY WITH INDEXES, DECEMBER 1968

Jan 1969 195 p refs

(NASA-SP-7011(58)) Avail CFSTI CSCL06

Subject coverage concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. Each entry consists of a standard citation accompanied by its abstract.

Author

N69-19033*# National Aeronautics and Space Administration
Washington D C

HEAT PROBLEMS IN SPACE MEDICINE [PROBLEMI TERMICI IN MEDICINA SPAZIALE]

Paolo Rota Feb 1969 11 p refs. Transl into ENGLISH from Italian Conf Proc. Presented at 8th Intern Tech and Sci Conf on Space Rome 1-3 Apr 1968.

(NASA-TT-F-12058) Avail CFSTI CSCL06S

The thermal characteristics of space flight and of the general principles of heat regulation are discussed. The physiological and technical criteria which govern the conditioning and thermal protection of space vehicles and clothing are treated. The limits of physical and psychic resistance to elevated temperatures and the pertinent screening, training, and acclimatizing problems are considered.

Author

N69-19039# New England Inst for Medical Research Ridgefield Conn

A STUDY ON CROSSOVER AND LEADING EDGE TIMING METHODS

S J Tao and A Ogata Sep 1968 18 p refs

(Contract AT(30-1)-3661)

(NYO-3661-13) Avail CFSTI

The practical resolutions obtained from both crossover and leading edge timing methods are compared with their theoretical resolutions. Practical resolution of about 200 psec may be obtained from both methods. However, for large dynamic range, crossover timing is superior.

Author (NSA)

N69-19055*# California Univ Berkeley Space Sciences Lab
TECHNOLOGY AND MORALS, AN OLD STORY
 Ida R Hoos Nov 1968 25 p refs /its Internal Working Paper
 No 90
 (Grant NGL-05-003-012)
 (NASA-CR-100032) Avail CFSTI CSCL 05K

The problems of controlling the rapid growth of twentieth century technology are discussed with emphasis on the moral and ethical responsibilities facing modern society Topics discussed include the use of nuclear energy for war and peace, progress in medical technology, such as the capability of organ transplants from one human to another, and the hazards of air pollution from industrial and radioactive contaminants A C R

N69-19083# Lockheed Missiles and Space Co Sunnyvale Calif Research and Development Div
DESIGN STUDY OF INTEGRATED LIFE SUPPORT SYSTEM FOR AEROSPACE APPLICATION UTILIZING RADIO-ISOTOPES FOR THERMAL ENERGY Final Report
 R V Elms Jr 31 Mar 1968 209 p refs
 (Contract AT(04-3)-739)
 (LMSC-680679) Avail CFSTI

The large amounts of thermal energy required to support crews for space missions beyond 180 days can be supplied by radioisotope thermal energy (RITE) sources Life support system (LSS) components and techniques to identify an integrated aerospace life support system providing the highest reliable usable payload with the lowest possible launch weight are evaluated RITE was also evaluated to determine the optimum energy source The evaluations of life support system components candidate isotopes and heating systems resulted in a conceptual design of an integrated life support system and the selection of an LSS component for detail design The conceptual system design utilizes an individual RITE source in the catalytic oxidizer and in the combined incinerator/urine vapor pyrolysis unit A third RITE source heats a central heat transfer fluid loop (375°F) to supply energy to the remaining LSS components A detailed design of the waste incinerator/urine vapor pyrolysis unit/RITE source was performed such that a functional-proof-of-principle component can be fabricated Author (NSA)

N69-19088# Joint Publications Research Service, Washington D C
SPACE BIOLOGY AND MEDICINE, VOLUME 2, NO 6
 5 Mar 1969 141 p refs Transl into ENGLISH from Kosmich Biol i Med (Moscow), v 2 no 6, 1968 p 3-96
 (JPRS-47582) Avail CFSTI

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N69-19090# Joint Publications Research Service, Washington D C
PHYSICOCHEMICAL SYNTHESIS OF MONOSACCHARIDES FROM THE PRODUCTS OF HUMAN VITAL FUNCTIONS
 Yu Ye Sinyak /in its Space Biol and Med Vol 2 No 6 5 Mar 1969 p 9-20 refs (See N69-19088 08-04)
 Avail CFSTI

The physicochemical synthesis of carbohydrates from the wastes of vital human functions is carried out through several intermediate reactions, the mandatory stage is the production of formaldehyde which during condensation yields carbohydrates The wastes are first mineralized under pressure and the resulting carbon dioxide is mixed with hydrogen and used to synthesize methanol for further oxidation into formaldehyde Included is a diagram of the physicochemical synthesis at increased pressure G G

N69-19091# Joint Publications Research Service Washington
D C

COMBINED EFFECT OF SPACE FLIGHT FACTORS ON THE "KOSMOS-110" ARTIFICIAL EARTH SATELLITE ON PLANTS

О F Gertsuskiy et al /In its Space Biol and Med Vol 2 No 3 5 Mar 1969 p 21-28 refs (See N69-19088 08-04)

Avail CFSTI

This paper presents data characterizing the effect exerted on plants by spaceflight factors involved in flight of the Kosmos-110 biosatellite. The plants grown from seeds flown aboard the Kosmos-110 biosatellite grew and developed faster, giving a higher yield than the controls. In comparison with the controls on earth the flight plants contained larger amounts of ascorbic acid and a higher percentage of water, although the sugar content was similar. These results cannot be attributed solely to the effect of ionizing radiation. They appear to be a combined result of space factors involved in the Kosmos-110 flight. Author

N69-19094# Joint Publications Research Service Washington
D C

IMMUNOLOGICAL AND HISTOCHEMICAL STUDY OF REACTIVITY OF MICE EXPOSED TO A HYPEROXIC ATMOSPHERE

A S Kaplanskiy et al /In its Space Biol and Med Vol 2 No 6 5 Mar 1969 p 46-52 refs (See N69-19088 08-04)

Avail CFSTI

Immunological and histochemical methods were used for studying the reactivity of mice exposed for 20 days to an atmosphere with $pO_2 = 304$ mm Hg. It is shown that an increased oxygen content in the breathed air produces no effect either on the rate of formation of antibodies or on the resistance of immunized mice to *Salmonella typhimurium* at the same time decreasing the phagocytic activity of neutrophils and increasing that of macrophages. A long-term exposure of animals to a hyperoxic environment resulted in a loss in weight of the body and lymph nodes and appearance of lymphoid tissue irritation. Author

N69-19092# Joint Publications Research Service Washington
D C

IMPAIRMENT OF CELL DIVISION IN BONE MARROW OF RATS IRRADIATED BY 50-MeV PROTONS

R D Govorun /In its Space Biol and Med Vol 2 no 6 5 Mar 1969 p 29-35 35 p (See N69-19088 08-04)

Avail CFSTI

The processes of cell division and depletion of bone marrow of rats exposed to whole-body irradiation by 50-MeV protons were studied. The irradiation was shown to disturb mitotic activity and division of bone marrow cells and to cause destructive changes. The changes in mitotic activity and number of aberrant mitoses and cells with nuclear destruction were observed for seven days after the exposure. The dose dependence of the number of aberrant cells and the value of the mitotic index were investigated one day after irradiation. A linear dose dependence of the number of aberrant mitoses was established for the dose range 100-550 rad. No significant differences were observed between the biological effect of 50-MeV protons and Co^{60} gamma rays. The relative biological effect is 1 or somewhat greater for the analyzed tests. Author

N69-19095# Joint Publications Research Service, Washington,
D C

EFFECT OF HIGH OXYGEN CONCENTRATIONS ON CONDITIONED REFLEX ACTIVITY AND BIOELECTRIC ACTIVITY OF SOME CORTICAL REGIONS AND SUBCORTICAL FORMATIONS IN RABBITS

N A Agadzhanian et al /In its Space Biol and Med, Vol 2, No 6 5 Mar 1969 p 53-62 refs (See N69-19088 08-04)

Avail CFSTI

A conditioned food-procuring reflex to the rhythmic flashing of a light was formed in rabbits. After conditioning the assimilation of the rhythm was recorded in the optical cortex and lateral area of the hypothalamus. The animals were exposed to a 96% oxygen atmosphere at 760 mm Hg. During the first two days the unconditioned and conditioned food-procuring reflexes were inhibited and assimilation of the rhythm was recorded in the optical cortex, ventromedial nucleus of the hypothalamus and reticular formation of the midbrain. This can be attributed to the excitation of adrenergic mechanisms of the nonspecific activating system. On the third-fourth days the unconditioned and conditioned responses and assimilation of rhythm disappeared. Predominance of theta- and alpha-like activity and bursts of hypersynchronized waves were registered on the EEG. Author

N69-19093# Joint Publications Research Service Washington
D C

EFFECT OF A SIMULATED MARTIAN ENVIRONMENT ON CERTAIN ENZYMES

Ye V Belikova et al /In its Space Biol and Med Vol 2 No 6 5 Mar 1969 p 36-45 refs (See N69-19088 08-04)

Avail CFSTI

The resistance of enzymes RNase, amylase and trypsin to a simulated Martian environment was investigated. It was found that in the simulated Martian atmosphere insolation excluded solutions of the tested enzymes were better preserved than on the earth at 4°C. After the introduction of the insolation factor the tested enzymes were activated as a result of a four-hour exposure to the Martian environment. The enzymes can be arranged in the order of their stability as follows: amylase, RNase, trypsin. When added to the enzymic solutions glycerin produced a stabilizing effect on all the enzymes in the simulated Martian environment, excluding the insolation factor, and exerted a protective effect on RNase and trypsin with the insolation factor taken into account. The pigments carotene and melanin served as protectors for the enzymes tested against the activating UV effect in the simulated Martian environment. Author

N69-19096# Joint Publications Research Service Washington
D C

EFFECT OF DIETS CONTAINING UNICELLULAR ALGAE ON METABOLISM RECOVERY IN PROTEIN-DEFICIENT WHITE RATS

N S Klyushkina et al /In its Space Biol and Med Vol 2 No 6 5 Mar 1969 p 63-70 refs (See N69-19088 08-04)

Avail CFSTI

Experiments were conducted to study the effect of diets containing a bleached biomass of unicellular algae as the only protein source on the recovery of metabolic processes in rats kept on protein-deficient diets. It was demonstrated that the algal diets promoted recovery to the same extent as the control diet containing casein, surpassing the effect of a protein diet containing soya. Author

N69-19097# Joint Publications Research Service Washington D C

THEORETICAL APPROACHES TO THE SELECTION OF PHYSIOLOGICAL PARAMETERS FOR MEDICAL MONITORING DURING MANNED SPACE FLIGHT

Yu G Nefedov et al *In its Space Biol and Med* Vol 2 No 6 5 Mar 1969 p 71-84 refs (See N69-19088 08-04)

Avail CFSTI

This paper discusses theoretical approaches to the selection of optimum physiological parameters required to diagnose and predict the health conditions of crew members during space flight. The authors also describe the criteria which can be used in selecting the most informative parameters and give their detailed physiological analysis. In addition, the article describes some methods for evaluating the physiological information including a covariance analysis which allows quantizing of the effects of certain spaceflight factors on the human body. Author

N69-19098# Joint Publications Research Service Washington D C

COORDINATION STRUCTURE OF MAN'S VOLUNTARY MOVEMENTS OF DIFFERENT COMPLEXITY ON A KEPLERIAN FLIGHT TRAJECTORY

I F Chekirda *In its Space Biol and Med* Vol 2 No 6 5 Mar 1969 p 85-95 refs (See N69-19088 08-04)

Avail CFSTI

Certain stages in the reorganization of the coordination structure of man's voluntary movements during short-term weightlessness were established. This made it possible to conduct a cyclographic analysis of the speed with which movements of different complexity can be adjusted to the zero gravity environment. It is shown that adaptation first involved movements at the synergy level followed by those of the spatial field level and finally movements of the level of objective actions. Author

N69-19099# Joint Publications Research Service, Washington D C

EFFECT OF AGE, OCCUPATION AND PHYSICAL TRAINING ON HUMAN TOLERANCE TO LONG-TERM ACCELERATIONS

P M Suvorov *In its Space Biol and Med* Vol 2, No 6 5 Mar 1969 p 96-103 refs (See N69-19088 08-04)

Avail CFSTI

The effect of age, occupation and physical training on human tolerance to long-term accelerations ($\pm G_z$ and $+G_x$) was investigated. A total of 427 test subjects including fighter pilots, engineers, physicians and research workers were used in the experiments. The lowest tolerance was found in test subjects in the age range 20-24 and the highest tolerance in subjects in the age range 30-34. Test subjects in the age range 40-49 exhibited a reduced tolerance to accelerations. Certain differences in acceleration tolerance and the pattern of physiological reactions were found between pilots and representatives of other occupations. Athletes, gymnasts, weight-lifters and acrobats exhibited a better tolerance than long-distance runners, football players and skiers who exhibited a tolerance level similar to that of persons who do not regularly participate in sports. Author

N69-19100# Joint Publications Research Service Washington, D C

TIME PERCEPTION DURING BRIEF WEIGHTLESSNESS

V I Lebedev et al *In its Space Biol and Med* Vol 2 no 6 5 Mar 1969 p 104-110 refs (See N69-19088 06-04)

Avail CFSTI

The perception of time intervals by astronauts and test subjects under brief weightlessness conditions during parabolic flights was studied. Compared was the accuracy of estimating time intervals when experiencing weightlessness with the accuracy of time estimates during performance of similar tasks in horizontal flight. Results confirmed the dependence of time perception on human emotional states during positive emotions under weightlessness conditions: a subjective acceleration of time passage was observed. G G

N69-19101# Joint Publications Research Service Washington D C

HUMAN TOLERANCE TO ACCELERATIONS AT REDUCED BAROMETRIC PRESSURE

A S Barer et al *In its Space Biol and Med* Vol 2 No 6 5 Mar 1969 p 111-119 refs (See N69-19088 08-04)

Avail CFSTI

The tolerance of humans exposed to accelerations at a low atmospheric pressure was studied in centrifuge experiments. Back-to-chest accelerations of 4 to 12 g were applied at an angle of 78° to the long axis of the body. During the first run the cabin atmosphere was equivalent to altitudes of 3 000, 4 000 and 5 000 m. During the second run the test subjects were exposed to accelerations of 8 and 12 g breathing gas mixtures with a reduced oxygen content. During the third run the test subjects were exposed to a pure oxygen environment equivalent to altitudes of 8 000 and 10 000 m. The human tolerance to accelerations was found to decrease with a pO_2 reduction in the breathed air. Certain regularities were noted in the changes of physiological function evaluated by recording electrocardiograms, tidal air volume, oxyhemoglobin, visual acuity, rheoencephalograms and plethysmograms. Author

N69-19102# Joint Publications Research Service Washington D C

SOME INDICES OF STATE OF THE CARDIOVASCULAR SYSTEM IN HEALTHY PERSONS

M L Kolomyevskiy *In its Space Biol and Med* Vol 2 No 6 5 Mar 1969 p 120-126 refs (See N69-19088 08-04)

Avail CFSTI

Clarified are selection methods for groups of practically healthy persons when conducting cardiological studies without rigorous definition of reliable selection criteria. Mean indices were obtained for the state of protein and lipid metabolism and also for bioelectric and contractive functions of the myocardium from EEG's, polycardiograms, lecithin and cholesterol levels, and protein and lipoprotein fractions in blood serums. Data were statistically processed and showed in a number of practically healthy persons latently transpiring symptom-free atheroscleroses. G G

N69-19103# Joint Publications Research Service Washington D C

CHANGES IN MYOCARDIAL REPOLARIZATION IN HEALTHY PERSONS DURING RESTRICTION OF MOTOR ACTIVITY

B A Korolev *In its Space Biol and Med* Vol 2 No 6 5 Mar 1969 p 127-134 refs (See N69-19088 08-04)
Avail CFSTI

A repolarization disturbance is indicated by development of the $T_{V_1} > T_{V_6}$ syndrome and appearance or increase in the amplitude of the U wave. It can also be suggested by changes in the ratio of the U and T amplitudes and change in the length of the aT-aU and S-aU segments as well as by the RR/S-aU ratio. The standard values of these parameters for healthy persons were established in 1963. The U wave is well pronounced in the U_3 lead. Therefore the U and T amplitudes U/T and RR/S-aU ratios and the aT-aU and S-aU segments were analyzed; attention also being given to the $T_{V_1} > T_{V_6}$ syndrome. A hypoxia test was used in studying the repolarization process in 16 healthy male test subjects exposed to long-term hypodynamia. This condition causes shifts in myocardial repolarization. Author

N69-19115*# National Aeronautics and Space Administration Langley Research Center Langley Station Va

AN ANALYSIS OF THE OPERATION OF A MASS MEASURING SYSTEM IN AN ORBITING SPACECRAFT

Bruce A Conway Washington Feb 1969 29 p refs
(NASA-TN-D-5039) Avail CFSTI CSCL 06B

An analysis of the operation of a mass measuring system which is based on the oscillating spring mass principle aboard a spacecraft is made. This analysis considers the dynamic effects of the oscillating device on an uncontrolled spacecraft by developing the equations of motion for the system. An approximate solution of these equations is then deduced and a simple analytic expression for the maximum attitude error is found. Numerical integration of the equations of motion was performed on a digital computer for some typical measurement operations. Comparison between the approximate and exact solutions for these cases was very close. Results showed small (less than 0.02°) attitude errors arising from the operation of this device. Author

N69-19125# Battelle-Northwest Richland Wash Pacific Northwest Lab
IONIZING RADIATION SURVEY AND CONTROL TECHNIQUES

W P Howell 19 Sep 1968 8 p Presented at Electromagnetic Spectrum Conf, Richland Wash
(BNWL-SA-2108 CONF-680930-3) Avail CFSTI

Control of exposure to ionizing radiation is discussed. Limitation of exposure time, use of maximum practicable distance between the radiation source and the exposed individual, and the use of shielding are fundamental considerations. Radiation instruments, survey techniques, and errors in measurement are discussed. NSA

N69-19126# Battelle-Northwest Richland Wash Pacific Northwest Lab

ELECTROMAGNETIC SPECTRUM IONIZING RADIATION, SOURCES OF EXPOSURE

W L Fisher 19 Sep 1968 7 p Presented at Electromagnetic Spectrum Conf, Richland Wash
(BNWL-SA-2109 CONF-680930-2) Avail CFSTI

A general discussion of radiation sources of exposure to both laboratory personnel and large populations is presented. It is pointed out that education of the user is essential for preventing radiation sources from being radiation exposures to man. NSA

N69-19139# Federal Aviation Administration Washington D C Office of Aviation Medicine

BIOMEDICAL APPLICATIONS OF A COMMERCIAL CAPACITANCE TRANSDUCER

Edward Podolak James B Kinn and Edwin E Westura Mar 1968 12 p refs
(AM-68-3) Avail CFSTI

A capacitance displacement transducer with a linear response and constant sensitivity for a frequency range of 0-1 000 hertz is described. Its application to measurement of chest wall motions was verified using static displacements from flat and curved surfaces and both human tissue and metal. The transducer has been used to obtain recordings of apex motion, heart sounds, brachial and radial pulses. Its advantages are that it is non-contacting and linear, that it has a wide frequency response and can easily be calibrated to obtain quantitative data of actual motion. Problems encountered in use were the mechanical positioning of the probe including respiratory motions in the measurements and the need to insulate the probe with a film of thin plastic to insure against an electrical hazard to the subject. Author

N69-19144# Environmental Sciences Services Administration Atlantic City N J Systems Development Office

EVALUATION OF MULTI-TRANSMISSOMETER SYSTEMS Final Report

Ernest E Schlatter and Matthew Lefkowitz Aug 1968 207 p refs
(SRDS-RD-68-49) Avail Issuing Activity

A test program was conducted to evaluate multi-transmissometer systems. These consisted primarily of instruments at touchdown, midpoint, and rollout locations on a runway at five airfields distributed across the U S continent in differing climatic regimes. Primary objective of the program was to determine if a need exists for three transmissometer systems per runway under a variety of weather conditions. The conclusions were affirmative, due primarily to the fact that differences in runway visual range as large as 2000 feet or greater do occur during low visual range conditions. These large variations might go undetected without a midpoint runway visual range measurement. Author

N69-19161*# National Aeronautics and Space Administration Washington D C

INVESTIGATIONS ON THE INDUCTION OF DORSIVENTRALITY IN FERN PROTHALLIA [UNTERSUCHUNGEN UBER DIE INDUKTION DER DORSIVENTRALITÄT BEI DEN FARNPROTHALLIEN]

Kurt Bussmann Nov 1966 50 p refs Transl into ENGLISH from *Jahrb Wiss Botanik* (West Ger) v 87 1939 p 565-624
(NASA-TT-F-10376) Avail CFSTI CSCL 06C

The greatest possible variety of fern genera with varying prothallial developments was used in the experiments. Several Polypodiaceae (mostly *Adiantum cuneatum* and also *Aspidium Filix*) were selected but mostly Osmundaceae. *Osmunda regalis* and the Parkeriaceae *Ceratopteris thalictroides*. Detailed treatment is given to the characteristics of prothallial development, the methodology and the orientation of the apical cell of young prothallia. Author

N69-19162*# National Aeronautics and Space Administration
Washington D C
INVESTIGATION OF THE INDUCTION OF DORSIVENTRALITY OF APOGAMIC FERN PROTHALLIA [UNTER SUCHUNGEN UEBER DIE INDUKTION DER DORSIVENTRALITAET BEI APOGAMEN FARNPROTHALLIEN]
Kurt Bussmann Oct 1966 20 p refs Transl into ENGLISH from Jahrb Wiss Botan (West Ger) v 89 1941 p 615-636
(NASA-TT-F-10375) Avail CFSTI CSCL06C

A study was made of the factors that induce dorsiventrality in an apogamic stock of fern prothallia which is believed to be a hybrid between *Dryopteris Filix mas* and *D paleacea*. There was general agreement with what is found in connection with sexual prothallia. In apogamic prothallia dorsiventrality is induced by the following factors: (1) Light: Inducement of the dorsal side proceeds towards the light (positive response). (2) Substrate: Inducement of the dorsal side proceeds for sexual fern prothallia toward the substrate (positive response). (3) Gravity: It turns the dorsal sides towards the zenith (negative induction). In nature the inducing effect of light is strongest. There is a long-lasting effect after induction of apogamic prothallia: reversal of dorsiventrality is only possible in young apogamic prothallia. Author

N69-19163*# National Aeronautics and Space Administration, Washington D C
CONTRIBUTIONS TO THE PHYSIOLOGY OF STRENUOUS PHYSICAL WORK. PART 9. HYPERTHERMIA AND BASAL METABOLISM [BEITRAGE ZUR PHYSIOLOGIE SCHWERER KOERPERLICHER ARBEIT. 9. MITTEILUNG. HYPERTHERMIE UND RUHESTOFFWECHSEL]
E Hohwue Christensen Jan 1967 8 p refs Transl into ENGLISH from Arb Physiol (West Ger) v 7 1934 p 120-129
(NASA-TT-F-10669) Avail CFSTI CSCL06S

Experiments on correlation between body temperature and metabolism during heavy physical work in comparison to diathermy treatment are discussed. Oxygen consumption increased by 10.8% on an increase in rectal temperature by 1°C, partly due to increased cardiac, respiratory and glandular activity. Rectal temperature maximum occurred 20 to 40 min after stopping the supply of heat in diathermy treatments and only a few minutes after stopping physical work, indicating a better temperature compensation of the body in active physical work due to accelerated circulation than in passive diathermy. Author

N69-19164# Cornell Aeronautical Lab Inc Buffalo N Y
PROBLEMS OF INFORMATION TRANSFER IN THE MODERN JET COCKPIT. Final Report
W C Schultz Dec 1968 24 p refs
(CAL-IH-2235-B-1) Avail Issuing Activity

If the time to act on signals is to be maximized, an objective that is assumed to be desirable, then more emphasis must be placed on improving the chances of acting quickly and properly on the signals that are available. Four facets of the problem of improving information transfer in the cockpit are considered: (1) discussion of the gaps which exist in the transfer of information to the pilot of a jet aircraft (e.g. the pilot not having sufficient information to quickly identify certain potentially dangerous flight conditions); (2) a taxonomy of flight safety research; (3) a discussion of how flight safety research might be correlated with careful regard for and consideration of the above taxonomy; and (4) a discussion of steps now being taken in a planned experimental approach towards improvement of information transfer in the cockpit. Author

N69-19302*# Southwest Research Inst., San Antonio Tex
SOUTHWEST RESEARCH INSTITUTE ASSISTANCE TO NASA IN BIOMEDICAL AREAS OF THE TECHNOLOGY UTILIZATION PROGRAM. Quarterly Progress Report, 1 Jul-30 Sep 1968
Ray W Ware, Louis S Berger and Felix L St Claire III 15 Oct 1968 54 p
(Contract NASw-1714)
(NASA-CR-100022 QPR-3) Avail CFSTI CSCL06

The status of all biomedical problems handled during this period is reported. The requestor's formulation and proposed steps toward solution are given for each of the problems. All documents furnished to the participants of the program are listed. The difficulties that are encountered in attempts to transfer NASA-derived technology as part of the Technology Utilization program to scientists in the biomedical fields are briefly discussed. K W

N69-19329*# National Aeronautics and Space Administration, Washington D C
CHANGE IN THE UNSPECIFIC REACTION OF THE ORGANISM DURING ADAPTATION TO HEAT
D Schwarz Mar 1968 54 p refs Transl into ENGLISH from DFL Rept 65-63
(NASA-TT-F-11575) Avail CFSTI CSCL06S

Under extreme environmental conditions such as occur in aviation or mining, man is subject to different types of stress. Adaptation to each individual type of stress involved is often not possible or at least very expensive. The present study attempts to prove that adaptation to one special type of stress (heat) will as well increase resistance against other types of stress (hypoxia, work cold). Author

N69-19360# Joint Publications Research Service, Washington D C
AUTOMATION TO INCREASE THE PRODUCTIVITY OF LABOR
A Letov. In: *Cybernetics and Regulation Theory*. USSR 13 Feb 1969 p 8-12. Transl into ENGLISH from Ekon Gazeta (Moscow), no 52 Dec 1968 p 36. (See N69-19358 08-34)
Avail CFSTI

The technological impact of automation on society is briefly assessed. Scientific and engineering problems concerned with the development of automation are reviewed and included: optimal control methods; constructing adaptive and self-adjusting systems; and development of principles on constructing automatic machines for engineering design operations. B P

N69-19364# United Kingdom Atomic Energy Authority, Harwell (England)
TYPE "A" PACKAGING FOR LIQUIDS AND GASES
F E Dixon, F K Olley and L R Cohen Aug 1968 60 p refs
(AERE-R-5701) Avail CFSTI UK 20s

A proposal is made for amendment of the Additional Tests specified in I-3 Annex IV and of design requirements in II-1 6 Annex II IAEA Safety Series No 6 (1967 edition) The median accident is given in Safety Series No 7 as the basis for the amount of contents allowed in a Type A package A Swedish experimental team in an interim report attempted to specify a median accident and this led to the series of tests described The conclusion appears to be that many Type A packages are capable of successfully withstanding the mechanical test prescribed in the regulations for Type B packaging and that if accidents more severe than the Type B tests are excluded there is no universal median accident The series of tests suggests that the parameters in I-3 Annex IV and II-1 6 Annex II of the IAEA regulations are inappropriate in light of present experience and an alternative approach to their respective requirements is suggested
Author (NSA)

N69-19369# Joint Publications Research Service, Washington D C
BIONICS

S N Braynes et al 3 Feb 1969 26 p refs Transl into ENGLISH from Kibernetika Na Sluzhbu Kommunizmu (Moscow) v 5 1967 p 197-213
(JPRS-47360) Avail CFSTI

Bionics research in Russia is divided into five areas and the results of some of this research are briefly summarized Analysis of the papers connected with investigation of receptors and analyzers indicated that along with detailed study of the visual and auditory analyzer more attention is being given to the study of the specific receptors of taste smell and tactile sense electric voltage receptors etc Another area of research is the simulation of the neurons nerve networks nerve centers, and principles of organization of the brain in order to find means of utilizing the studied principles and technical systems The third area constitutes the study of the mechanisms of orientation navigation and range and detection developed in the process of long term evolution of the animal world and the utilization of the organizational principles of these mechanisms for the construction of small size and reliable technical systems Other aspects of bionic research include biomechanics and bioenergetics and the bionics aspects of the man-machine problem
B P

N69-19376# Joint Publications Research Service Washington D C

THEORY AND DESIGN OF EJECTION-TYPE ATOMIZER

S A Glukhov 6 Feb 1969 13 p refs Transl into ENGLISH from Med Tekhn (Moscow) Nov-Dec 1968 p 20-26
(JPRS-47395) Avail CFSTI

Theoretical and experimental design data are presented on an ejection-type atomizer for aerosol therapy equipment Equations are formulated to obtain the series of parameters affecting the process of liquid atomization by these atomizers Consideration is also given to the interrelations and the reciprocal influence of geometric and physical parameters and the most important functional characteristics of aerosol apparatuses as determined by the choice and operating conditions of the atomizer These include the working air pressure and air flow rate mean mass radius of aerosol particles and gravimetric determination of their size and flow rate of the atomized liquid The necessity of calibrating the atomizer for each and every medicine is emphasized
M G J

**N69-19405* TRW Systems Redondo Beach Calif
THERMAL PROPERTY MEASUREMENTS OF MANNED
SPACECRAFT CENTER SPACESUIT MATERIALS**

F J Turnbow 17 Jan 1969 8 p refs

(Contract NAS9-3670)

(NASA-CR-99535 TRW-69-8526 16w-03) Avail CFSTI CSCL 06K

The thermophysical properties of polysulfane have been measured The properties of interest were (a) solar reflectance (b) solar transmittance and (c) normal emittance Measurements of the subject properties were taken both on the coated and uncoated surfaces Results of the solar reflectance and transmittance measurements on the polysulfane (uncoated) side of the sample were previously reported They are included herewith as an aide to data evaluation
Author

N69-19422*# Research Triangle Inst Durham, N C Engineering and Environmental Sciences Div

**BIOMEDICAL APPLICATIONS OF NASA SCIENCE AND
TECHNOLOGY Quarterly Progress Report, 15 Sep-14 Dec
1968**

James N Brown, Jr et al 14 Dec 1968 72 p refs

(Contract NSR-34-004-056)

(NASA-CR-100025 RTI-EU-411-1 QPR-2) Avail CFSTI CSCL 06

The NASA-supported Biomedical Application Team at the Research Triangle Institute identified 6 new problems performed significant activities on 15 of the active problems identified previously performed 5 computer searches of the NASA Aerospace literature and maintained one current awareness search As a partial result of these activities one technology transfer was accomplished As a part of continuing problem review 13 problems were classified inactive Activities involved all phases of team activity with respect to biomedical problems The numbers of new problems identified and transfers and potential transfers were relatively low during this quarter Most of the activities were directed toward obtaining information related to problems already identified
Author

N69-19423# Norwegian Defence Research Establishment Kjeller
**STUDIES OF THE LETHAL EFFECTS OF X-RAYS ON
ESCHERICHIA COLI**

Ivar Johansen Sep 1968 57 p refs

(PD-5802 NDRE-56) Avail CFSTI

The lethal effects of X-rays on *E coli* were investigated Evidence is presented that radiation-induced injuries in the cell content of deoxyribonucleic acid are responsible for reproductive death Radiation chemical reactions which modify cellular response to radiation were studied The mode of action of various substances in protection or in sensitization of cells to radiation is discussed
Author

N69-19429*# Jet Propulsion Lab, Calif Inst of Tech, Pasadena
PROJECT ENGINEERING DIVISION

In its Space Programs Sum No 37-54 Vol 3 Oct-Nov 1968

31 Dec 1968 P 37-39 refs (See N69-19427 08-34)

Avail CFSTI CSCL 06M

The effect of low numbers of microorganisms on samples

assayed by NASA standard procedures is discussed, and the accuracy of extrapolation using two different assay and recovery techniques under such conditions is evaluated. This analysis was undertaken due to the reduced numbers of viable bacteria found in spacecraft assembled in class 100 clean rooms as was evidenced during the Mariner Venus 1967 sampling program. Data from the capsule mechanical training model assemblies under the direction of the sterilization assembly development laboratory were used to form a data base for the statistical analysis. The samples coupons and swabs were selected at random and tested by two procedures: one incubating the plates for only aerobic bacteria while the other incubated for both aerobic and anaerobic bacteria. Conclusions were reached as to the effects of using swabs versus coupons, the difference in recovery percentage between the two types of procedures, and the need for reevaluation of the basic assumptions behind the entire sampling and extrapolation program where the number of organisms per sample is low. A C R

N69-19444 New Mexico Univ. Albuquerque
CHANGES IN EEG, TEMPERATURE, AND BEHAVIOR AS A FUNCTION OF PROLONGED SLEEP DEPRIVATION

George Vernon Pegram Jr (Ph D Thesis) 1968 86 p
 Avail Univ Microfilms HC \$4 60/Microfilm \$3 00 Order No 68-11661

An experiment using 6 Macaca mulatta monkeys was conducted to determine the physiological and behavioral changes concomitant with 176 hours of sleep deprivation. The physiological changes were observed by recording EEG and cortical brain temperature continuously throughout 5 days of baseline, 8 days of deprivation and 8 days of recovery. Primarily behavioral changes were observed by performance on a delayed matched-to-sample task during which the Ss worked for food pellets. The 24 hour cycle based on cortical temperature showed a disruption during deprivation and the return of this 24 hour cycle did not correspond with the EEG or behavioral recovery data. There was some evidence that performance on a delayed matched-to-sample task for food could continue unchanged through 8 days of sleep deprivation. The important behavioral finding was not one of consistent impairment but one of wide individual tolerance to sleep loss. Dissert Abstr

N69-19445 Purdue Univ. Lafayette Ind
LATE RESPONSES TO SPEECH STIMULI AS DEMONSTRATED BY ELECTROENCEPHALOGRAPHY UTILIZING A SUMMING COMPUTER TECHNIQUE

Henry Tobin (Ph D Thesis) 1968 152 p
 Avail Univ Microfilms HC \$7 20/Microfilm \$3 00 Order No 68-12629

A summing computer was employed for an electroencephalographic audiometric (EEA) investigation in an attempt to identify differences in response parameters that were related to the linguistic relevance of speech and speech-like signals. Four normal adults, two male and two female, were tested. Within the restrictions of a limited sample, the following conclusions seemed appropriate: (1) When the close componentry following and small range of latency variability for the signal [kaet] during its time course and for approximately an equal period beyond it are considered, it seems possible that this is an indication of some relationship between linguistic relevance and response parameters. (2) Speech signals initiated by a voiceless stop consonant can be just as effective in producing an auditorily evoked response as nonlinguistic signals whose initial wave front exhibits a fast rise-time. Differences in the waveform of the evoked responses appear to be related to the acoustic properties of the signals. Dissert Abstr

N69-19470 Claremont Mens Coll. Calif. Graduate School
THE EFFECTS OF CONTROLLED MOVEMENT AND INTENSITY PARAMETERS ON THE PERCEPTION OF AN ENTOPTIC STABILIZED IMAGE

Michael John Seven (Ph D Thesis) 1967 190 p
 Avail Univ Microfilms HC \$8 60/Microfilm \$3 00 Order No 68-10543

An entoptic stabilized image of the retinal blood vessels was produced by a projected spot of light centered on the sclera just beneath the lower edge of the subject's iris. Without temporal change, this image would disappear almost immediately. Temporal change factors were introduced by oscillating this trans-scleral illumination horizontally while the subject fixated the center of an illuminated background. Ten subjects were used in a Lindquist Type VI mixed design: five receiving a high intensity stimulus and five a low-intensity stimulus. Each subject received the 54 combinations of the other four variables in 54 one-minute trials. The dependent variable was a measure of image quality and persistence derived from the subject's continuous evaluation of the image in terms of four objective categories. The data were analyzed using analysis of variance, trend analysis, and Duncan's multiple-range test. Dissert Abstr

N69-19482 Massachusetts Univ. Amherst
THE EFFECT OF ADVANCE CUEING ON THE DETECTION OF TARGETS IN A VISUAL SEARCH TASK

Joseph Francis Hearn (Ph D Thesis) 1968 15 p
 Avail Univ Microfilms HC \$3 60/Microfilm \$3 00 Order No 68-9176

The purpose of the present experiment was to overcome the limitations of inequitable visual search and the interacting effects of short- and long-term memory found in the target detection experiments of Hearn and Moss (in preparation) and Teichner and associates. It was hypothesized that these problems could be overcome by the dual processes of advanced cueing and target color coding. The data of the total number of targets correctly reported, the percentage of targets correctly reported, and total point accumulations indicated that target color coding significantly facilitated search under the most difficult detection conditions and completely eliminated the interacting effects of short- and long-term memory. The effect of advance cueing was negated by its short exposure time. Two models are hypothesized to account for the detection and report of targets in this task. Dissert Abstr

N69-19483 Brandeis Univ. Waltham Mass
SOME INVESTIGATIONS OF THE AUDIOGYRAL ILLUSION

Gene Lester (Ph D Thesis) 1968 167 p
 Avail Univ Microfilms HC \$7 80/Microfilm \$3 00 Order No 68-9938

This dissertation describes a series of investigation of the audiogyral illusion, a phenomenon which occurs when a S is subjected to angular acceleration around his vertical axis. When the illusion occurs, a sound which is maintaining a constant position with regard to S appears to S as if it were displaced in a systematic fashion. During angular acceleration, the sound appears displaced in the direction counter to rotation. Our investigations sought to give a clear demonstration of the illusion. A second intention of the investigations was to test three hypotheses about the basis of the illusion. Dissert Abstr

N69-19487 Pennsylvania Univ. Philadelphia
THE EFFECTS OF MUSCLE STRETCH ON CALCIUM RELEASE DURING STIMULATION

Joy Antoinette Sopis (Ph D Thesis) 1967 119 p
 Avail Univ Microfilms HC \$5 80/Microfilm \$3 00 Order No 68-9240

Studies were performed to see if the increased efflux of Ca^{45} was present in a muscle stretched so that there was no overlap of the thick and thin filaments (160% of reference length) Frog semi-tendinosus muscles were soaked 8 to 10 hours in a Ca^{45} Ringers and then washed out in normal Ringers for 120 minutes Muscles were suspended and tetanically stimulated alternately at reference length and at 160% of reference length Effluent was collected every 30 seconds dried and counted The muscles at reference length showed a three times greater increase in efflux of Ca^{45} with stimulation than the muscles stimulated at 160% of reference length A 30 second exposure to caffeine (8mM) produced a reversible contracture and the resulting increases in efflux of Ca^{45} at reference length and at 160% of reference length were the same Caffeine causes contractures by releasing Ca from its intracellular stores in the sarcoplasmic reticulum

Dissert Abstr

N69-19523# Joint Publications Research Service Washington D C

BIOLOGICAL EFFECT OF HIGH-FREQUENCY ULTRASOUND

N S Arkhipov et al 4 Feb 1969 11 p refs Transl into ENGLISH from Terapevt Arkh (Medgiz), v 40 no 12 Dec 1968 p 3-9
 (JPRS-47378) Avail CFSTI

An historical survey of the biophysiological uses and effects of ultrasonic radiation was made After reviewing the literature the following conclusions were reached (1) The effect of ultrasonic waves on tissues is related to a mechanical and vibratory action (2) A stream of high frequency ultrasonic waves of high intensity at prolonged exposure can lead to destruction of exposed tissues and organs (3) Prolonged exposure of the organism to impulse ultrasonic waves of intermediate intensity for therapeutic and diagnostic purposes did not have an adverse effect on exposed organs and tissues (4) In low intensity doses ultrasonic waves can stimulate vital processes in tissues and organs and can also elicit reflex action

B P

N69-19525# Joint Publications Research Service Washington D C

SEVERAL MECHANISMS OF REDUCING ORTHOSTATIC TOLERANCE IN EXPERIMENTS WITH SIMULATION OF WEIGHTLESSNESS [NEKOTORYYE MEKHANIZMY SNIZHENIYA ORTOSTATICHESKOY USTOYCHIVOSTI V EKSPERIMENTAKH S IMITATSIYEV NEVESOMOSTI]

I D Pestov 13 Feb 1969 13 p refs Transl into ENGLISH from Russian paper Presented at 19th Congr of the Intern Astronautical Federation, Moscow Oct 1968 p 1-13
 (JPRS-47452) Avail CFSTI

In 41 experiments involving water immersion of 18 hours

duration (18 test subjects) it was established that compensated and uncompensated forms of orthostatic intolerance (with and without collapse) arise in association with identical water metabolism changes thus they may not be distinguished solely by the extent of body dehydration Orthostatic collapse develops more often in test subjects with instability of autonomic functions and may be prevented by use of pharmacologic stimulants In a 70 day bed-rest experiment (16 test subjects) a reduction of vascular elasticity in the lower extremities was observed which partially facilitates compensation for the orthostatic disorders Maintenance of normal elasticity of these vessels with the aid of an occlusion-type femoral cuff increases the body's reserve volume of blood along with orthostatic disorders

Author

N69-19547# National Research Council of Canada Ottawa (Ontario)

SHORT NOTE ON THE DISTRIBUTION AND BIOLOGICAL ACTION OF RADIOACTIVE ISOTOPES [BREVE NOTA SULLA DISTRIBUZIONE E AZIONE BIOLOGICA DEGLI ISOTOPI RADIOATTIVI]

F G Granone 1968 11 p refs Transl into ENGLISH from Minerva Radiobiol Fisioterap e Radiobiol (Torino) Italy v 11 no 11 1966 p 604-608 1966

(NRC-TT-1345) Avail CFSTI

Based on a literature review of the experimental data a comparative study was made to distinguish certain substantial differences in the distribution of radioactive substances and in the manner of their elimination by the organism It is noted (1) Radionuclides falling within individual groups of the periodic system show common characteristics (2) In radiobiological research employing radioactive isotopes great importance is attached to the kinetics of their accumulation in and elimination from the organs Reliable experimental results show that the values of successive accumulations and eliminations change with time (3) Estimation of the degree of toxicity referred to the effective dose expressed in curies can lead to erroneous deductions concerning the true toxicity of the various nuclides (4) An important factor in determining the specific nature of radiation sickness is the type of distribution of the radioactive element

M G J

N69-19573 National Lending Library for Science and Technology Boston Spa (England)

CLOSED-CIRCUIT OXYGEN BREATHING APPARATUS REQUIREMENTS AND TECHNICAL TESTS [APARATY TLENOWE REGENERACYJNE Z TLENEM SPREZONYM WYMAGANIA I BADANIA TECHNICZNE]

Nov 1968 32 p Transl into ENGLISH of Polish report PN-65/Z-04077

(NLL-SMRE-Trans-5634-(8313 6)) Avail Natl Lending Library Boston Spa Engl

Standard requirements and technical tests for a self sustaining oxygen breathing apparatus using compressed oxygen cylinders recommended by the Polish Standardization Committee are presented Technical requirements for each component applications of the equipment for general rescue or escape work packing and transport of the apparatus and a description of the performance tests which should be conducted are described In addition physiological tests using human subjects and methods of assessing the test results are also treated

A C R

N69-19383# Japan Atomic Energy Research Inst Tokyo
DETERMINATION OF TRACE ELEMENTS IN DNASE I BY THE ACTIVATION ANALYSIS

Asako Waki et al Dec 1968 9 p refs Transl into ENGLISH from Dobutsugaku Zasshi Zasshi (Tokyo) v 76, no 7 Jul 1967 p 235-238
 (NSJ-Tr-141) Avail CFSTI

Commercially available DNase I (bovine pancreatic) was activated by exposing to a neutron flux of approximately 5×10^{12} n/cm²/sec for 30 minutes. Then γ -rays from ²⁴Na ²⁷Mg and ⁵⁶Mn, and β -rays from ³²P derived from the nuclear reaction ³²S(n,p)³²P were detected. By counting these radio activities contents of these elements in DNase I were determined. The results were as follows: Na 0.275-1.675 μ g/mg-DNase I, Mg 0-13.25 μ g/mg-DNase I, and Mn 0.105-0.150 μ g/mg-DNase I. These elements could easily be removed by dialyzing DNase I against redistilled water. Author

N69-19591# Joint Publications Research Service Washington D C

PAPERS FROM THE THIRD INTERNATIONAL SYMPOSIUM ON BASIC ENVIRONMENTAL PROBLEMS OF MAN IN SPACE, USSR

6 Feb 1969 55 p refs Transl into ENGLISH from various Russian Conf Papers Held at Geneva 19-22 Nov 1968 (JPRS-47398) Avail CFSTI

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4. **REACTIVITY IN LONG SPACEFLIGHTS** P V Vasilyev p 28-35 refs (See N69-19595 08-04)

5. **SLEEP AND ITS LIMITATIONS IN LONG SPACEFLIGHTS** V P Zukhar p 36-44 refs (See N69-19596 08-04)

6. **PHYSIOLOGICAL REACTIONS TO AND POSSIBLE MEANS OF PROTECTION AGAINST PROLONGED WEIGHTLESSNESS** B B Yegorov p 45-50 (See N69-19597 08-04)

N69-19592# Joint Publications Research Service Washington D C

PHYSIOLOGICAL PROBLEMS OF PROLONGED WEIGHTLESSNESS

N N Gurovskiy et al In its Papers from the Third Intern Symp on Basic Environ Problems of Man in Space USSR 6 Feb 1969 p 1-12 (See N69-19591 08-04)
 Avail CFSTI

Experimental techniques and data obtained with the two dogs during the 22-day flight of Cosmos 110 and in subsequent examinations are discussed. The results are compared with those obtained with four dogs in a concurrently conducted ground experiment that completely duplicated the research aboard Cosmos 110. Cardiovascular functions, hemodynamic disturbances resulting from weightlessness, and the accompanying hypokinesia were

investigated. The analysis of the data shows that a comparatively long stay aboard a spacecraft results in qualitatively new and pronounced changes in highly developed animals. Among the significant changes were the loss of 30% of body weight and disruption of the ionic equilibrium, apparently related to loss of water by the tissues. KW

N69-19593# Joint Publications Research Service, Washington D C

BODY REACTIONS TO EXTREME FACTORS

V V Antipov et al In its Papers from the Third Intern Symp on Basic Environ Problems of Man in Space USSR 6 Feb 1969 p 13-21 refs (See N69-19591 08-04)

Avail CFSTI

The effects of such dynamic space flight stresses as vibration, acceleration, and to a lesser extent, weightlessness when combined with radiation effects were studied on animals. Besides being of theoretical interest, the studies also had two applied aspects: determination of the maximum permissible levels of radiation for spacecraft crews and determination of effective methods of providing protection against radiation injury during space flight. The general biological patterns of both the isolated and the combined effects of extreme factors on living organisms were analyzed. Experiments were performed on organisms with different levels of phylogenetic development, using a variety of methods. Mice and guinea pigs were used to determine tolerance to acceleration, cardiac rate after administration of antiradiation drugs, and changes in ceruloplasmin activity. The antiradiation drugs cystamine, AET, serotonin, and 5-methoxytryptamine (5-MOT) were tested. KW

N69-19594# Joint Publications Research Service Washington D C

SOME COMPENSATORY REACTIONS IN PROLONGED WEIGHTLESSNESS

J Walawski In its Papers from the Third Intern Symp on Basic Environ Problems of Man in Space, USSR 6 Feb 1969 p 22-27 (See N69-19591 08-04)

Avail CFSTI

The current stand of knowledge regarding the effects of weightlessness on the circulatory, respiratory, blood, digestive, and nervous systems and on the metabolism is reviewed. The general findings of several investigators are discussed as well as specific experiments on vascular reactions to intravenous injections of neurohormones during simulated weightlessness by immersion. Problems in the various methods of simulating weightlessness are briefly discussed. The role of the indirect or neurological factor which originates mostly in emotional phenomena on reactivity changes under conditions of weightlessness is considered. KW

N69-19595# Joint Publications Research Service, Washington D C

REACTIVITY IN LONG SPACEFLIGHTS

P V Vasilyev In its Papers from the Third Intern Symp on Basic Environ Problems on Man in Space USSR 6 Feb 1969 p 28-35 refs (See N69-19591 08-04)

Avail CFSTI

Weightlessness and hypodynamia have been found to produce changes in the functioning of the circulatory, respiratory, excretory, and analyzer systems and in various metabolic processes. Functional reorganization of these systems must inevitably result in changes in general reactivity closely related to body resistance. The literature

and findings are analyzed which indicate that weightlessness and hypodynamia reduce orthostatic and vestibular tolerance increase susceptibility to infection lower resistance to acceleration and physical exercise and alter reactivity to drugs These observations demonstrate the need for a thorough study of the various effects of weightlessness on the human body especially those of weightlessness combined with other factors during long spaceflights

Author

N69-19596# Joint Publications Research Service Washington D C

SLEEP AND ITS LIMITATIONS IN LONG SPACEFLIGHTS

V P Zukhar *In its* Papers from the Third Intern Symp on Basic Environ Problems of Man in Space USSR 6 Feb 1969 p 36-44 refs (See N69-19591 08-04)

Avail CFSTI

The main factors that may alter the sleep patterns of man and influence the duration and phase correlation of sleep are briefly discussed including (1) weightlessness and related changes in the nature of the information arriving from the proprioceptive and exteroceptive receptors and vestibular apparatus, (2) hypokinesia and hypodynamia which are severe complications of weightlessness and confinement to the limited living space (3) nervous and emotional strain caused by the dangers responsibilities and unusual nature of spaceflight (4) limited range of activity meager information and monotonous surroundings and (5) changes in the circadian rhythms light air temperature and noise background Data are presented on an investigation of sleep under conditions simulating space flight Some methods for physiological control of sleep patterns are suggested The comparative effectiveness of various ways of organizing the sleep and rest of astronauts during long spaceflights is evaluated

Author

N69-19597# Joint Publications Research Service Washington D C

PHYSIOLOGICAL REACTIONS TO AND POSSIBLE MEANS OF PROTECTION AGAINST PROLONGED WEIGHTLESSNESS

B B Yegorov *In its* Papers from the Third Intern Symp on Basic Environ Problems of Man in Space USSR 6 Feb 1969 p 45-50 (See N69-19591 08-04)

Avail CFSTI

Ground experiments were conducted in which stimulation of the vestibular apparatus by caloric and polarization served as a model There was a distinct reaction by the autonomic nervous system lowering of arterial pressure and slowing of the cardiac rate Electrical stimulation was used to normalize the flow of impulses from the proprioceptors The thigh muscles and prelum abdominale were stimulated by electrical impulses at a frequency of 100 Hz The hypothesis that the skeletal musculature after electrical stimulation becomes the source of a powerful flow of afferent impulses and a central formation of the nervous system was confirmed by the results of the experiments Attention was also paid to bony tissues in an effort to find ways of protecting the weightbearing locomotor apparatus Studies on calcium metabolism involving the use of isotopes were undertaken on rats in order to elucidate some of the pathogenic mechanisms governing decalcification Also briefly described are studies concerned with the possibility of increasing body resistance to accelerations in the final stage of space flight A 15-minute orthostatic load served here as a functional test

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IAA ENTRIES

A69-18373 *

LIZARD REFLECTIVITY CHANGE AND ITS EFFECT ON LIGHT TRANSMISSION THROUGH BODY WALL

Warren P. Porter (Washington University, Center for the Biology of Natural Systems, Missouri Botanical Garden, St. Louis, Mo.) and Kenneth S. Norris (California, University, Dept. of Zoology, Los Angeles, Calif.)

Science, vol. 163, Jan. 31, 1969, p. 482-484. 18 refs.

PHS Grant No. ES-00139, NSF Grant No. GB-4566, Grant No.

NSG(T)-4-62

Light transmission through the body wall of living, color-labile desert iguanas (*Dipsosaurus dorsalis*) was measured by spectrophotometry. In the dark phase, the body wall's absorption of UV light and visible light was approximately twice that of the body wall in the light phase. The shorter wavelengths of UV could penetrate the body wall in the light phase but not in the dark phase. The intensity and wavelengths of light which could penetrate the body wall without pigments are potentially mutagenic when judged by bacterial standards. (Author)

A69-18380

CYBERNETIC PROBLEMS IN BIONICS, PROCEEDINGS OF THE BIONICS SYMPOSIUM, DAYTON, OHIO, MAY 3-5, 1966.

Symposium sponsored by the U.S. Air Force

Edited by H. L. Oestreicher (USAF, Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio) and D. R. Moore

(USAF, Avionics Laboratory, Wright-Patterson AFB, Ohio)

New York, Gordon and Breach, Science Publishers, Inc., 1968

911 p.

\$45.

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FOREWORD. H. L. Oestreicher (USAF, Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio) and D. R. Moore (USAF, Avionics Laboratory, Wright-Patterson AFB, Ohio), p. v-vii.

ADAPTIVE PATTERN RECOGNITION - A SURVEY. N. J. Nilsson (Stanford Research Institute, Menlo Park, Calif.), p. 103-146. 64 refs. [See A69-18381 07-08]

SELF-ORGANIZING AND LEARNING CONTROL SYSTEMS

R. L. Barron (Adaptronics, Inc., McLean, Va.), p. 147-203

36 refs. [See A69-18382 07-10]

AN ANALYTICAL MODEL OF THE "BUG DETECTOR" GANGLION CELL IN THE FROG'S RETINA. R. Moreno-Diaz (Massachusetts Institute of Technology, Cambridge, Mass.), p. 481-491. 12 refs. [See A69-18383 07-05]

MATHEMATICAL MODEL OF THE ENCODING FUNCTION OF THE EIGHTH NERVE NEURON. M. W. Cannon (USAF, Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio), p. 513-530. 5 refs. [See A69-18384 07-05]

A CYBERNETIC MODEL FOR SOME TYPES OF LEARNING AND MENTATION. G. Pask (System Research, Ltd., Richmond, Surrey, England), p. 531-585. 100 refs. [See A69-18385 07-05]

A METHOD OF SELF-FEATURING INFORMATION COMPRESSION IN PATTERN RECOGNITION. S. Watanabe (Yale University, New Haven, Conn.), p. 697-707. 11 refs. [See A69-18386 07-08]

ADAPTIVE SYSTEMS USING LEARNING MATRICES

K. Steinbuch and E. Schmitt (Karlsruhe, Technische Universität, Karlsruhe, West Germany), p. 751-768. 7 refs. [See A69-18387 07-08]

VEHICLE CONTROL EXPERIMENTS WITH LARGE ARTIFICIAL NERVE NETWORK (LANNET). E. M. Connelly (Melpar, Inc., Falls Church, Va.), p. 845-865. 6 refs. [See A69-18388 07-05]

APPLICATION OF BIONICS TO SPACECRAFT ENERGY ALLOCATION. J. M. Icelsohn, R. M. Center (Bendix Corp., Southfield, Mich.), and A. Speake (USAF, Avionics Laboratory, Wright-Patterson AFB, Ohio), p. 867-883. [See A69-18389 07-03]

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A69-18383 *

AN ANALYTICAL MODEL OF THE "BUG DETECTOR" GANGLION CELL IN THE FROG'S RETINA

Roberto Moreno-Diaz (Massachusetts Institute of Technology, Instrumentation Laboratory, Cambridge, Mass.)

IN: CYBERNETIC PROBLEMS IN BIONICS, PROCEEDINGS OF THE BIONICS SYMPOSIUM, DAYTON, OHIO, MAY 3-5, 1966

[A69-18380 07-05]

Symposium sponsored by the U.S. Air Force.

Edited by H. L. Oestreicher and D. R. Moore

New York, Gordon and Breach, Science Publishers, Inc., 1968,

p. 481-491. 12 refs.

Contract No. NSR-22-009-138.

Discussion of an analytical model consistent with previous research into four major groups of retinal ganglion which report to the tectum, thus making possible the measurement of signals in the optic fibers of frogs. In structuring the model, the anatomy of the group 2 ganglion cell described by Lettvin (1959) is followed. The operation of the model is summarized, and an equation is derived for the evaluation of its performance. The construction of such models is shown to be of importance to engineers and neurophysiologists, both for constructing advanced and versatile engineering systems, and interrelating experimental results with neurophysiological findings. B.H.

A69-18384

MATHEMATICAL MODEL OF THE ENCODING FUNCTION OF THE EIGHTH NERVE NEURON.

Mark W. Cannon (USAF, Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio).

IN: CYBERNETIC PROBLEMS IN BIONICS, PROCEEDINGS OF THE BIONICS SYMPOSIUM, DAYTON, OHIO, MAY 3-5, 1966

[A69-18380 07-05]

Symposium sponsored by the U.S. Air Force

Edited by H. L. Oestreicher and D. R. Moore

New York, Gordon and Breach, Science Publishers, Inc., 1968

p. 513-530. 5 refs.

Description of a mathematical model of the spike activity of auditory neurons. The model is constructed from a functional point of view. An interspike density is postulated which is a function of the magnitude and rate of change of a generating potential, the rate of change being a function of both basilar membrane displacement and average firing rate of the model neuron. The model produces pulse occurrence histograms which compare very well with recorded data, and also matches curves of average firing rate vs input intensity from a number of units recorded in both the guinea pig and the monkey. B.H.

A69-18385

A CYBERNETIC MODEL FOR SOME TYPES OF LEARNING AND MENTATION

Gordon Pask (System Research, Ltd., Richmond, Surrey, England).

IN: CYBERNETIC PROBLEMS IN BIONICS, PROCEEDINGS OF THE BIONICS SYMPOSIUM, DAYTON, OHIO, MAY 3-5, 1966.

[A69-18380 07-05]

Symposium sponsored by the U.S. Air Force

Edited by H. L. Oestreicher and D. R. Moore

New York, Gordon and Breach, Science Publishers, Inc., 1968,

p. 531-585. 100 refs.

Contract No. AF 61(052)-640

Discussion of structural models based on the cybernetic theory or a class of related models. This class of models is broad enough to comprehend symbol systems, languages, and homeostatic mechanisms, as well as some of the physiological constructs involved, and is distinguished from descriptive models, which merely try to explain the processes of mentation rather than to reconstruct what goes on in the brain. The object language which is associated with the cybernetic model is discussed, and a graphical notation is given for representing control units and their composition to form cybernetic models. Composition rules are analyzed and learning systems are discussed in terms of problem solving in particular situations, making and retaining abstract descriptions and representations of concept learning, and other processes. B.H.

A69-18388

A69-18388

VEHICLE CONTROL EXPERIMENTS WITH LARGE ARTIFICIAL NERVE NETWORK (LANNET).

E. M. Connelly (Melpar, Inc., Falls Church, Va.).
IN CYBERNETIC PROBLEMS IN BIONICS, PROCEEDINGS OF THE BIONICS SYMPOSIUM, DAYTON, OHIO, MAY 3-5, 1966. [A69-18380 07-05]

Symposium sponsored by the U. S. Air Force.
Edited by H. L. Oestreicher and D. R. Moore
New York, Gordon and Breach, Science Publishers, Inc., 1968, p. 845-865. 6 refs.

Experimental study of the use of self-organizing trainable logical networks (TLN) as stable controllers in a multiaxis problem. The basic concepts of a TLN are reviewed, including results of theoretical work on the theory of training. The organization requirements are specified, and a method of achieving rapid organization using a potential function concept is given. The results of the experimental program indicate that LANNET can be properly organized on-line, and that the organization time is less than the plant time constants. B.H.

A69-18537

STUDY OF THE RESISTANCE OF CERTAIN INVERTEBRATE SPECIES TO EXPLOSIVE DECOMPRESSION AND LOW END PRESSURE [DOSLIDZHENNIA REZISTENTNOSTI DELAKIKH VIDIV BEZKHBETNIKH TVARIN DO VIBUKHOVOI DEKOMPRESII TA NIZ'KOGO KINTSEVOGO TISKU]

V. Ia. Lukhanin (Akademiia Nauk Ukrain's'koi RSR, Institut Fiziologii, Viddil Patologii Gipo- ta Giperoksichnikh Staniv, Kiev, Ukrainian SSR)

Fiziologichnyi Zhurnal, vol. 14, Nov.-Dec. 1968, p. 791-797
11 refs. In Ukrainian

Study of the stability of infusoria, hydra, slugs, and worms under the action of single and multiple abrupt pressure drops down to 50, 20, and 1 to 2 torr within 1 to 60 sec, produced by instantaneously connecting the experimental chamber to a larger pressure chamber with evacuated air. Hypoxia or freezing (at pressures of 1 to 2 torr), rather than the pressure drop itself, are found to have caused the death of these organisms in these experiments. V. Z.

A69-18568

CERTAIN PHYSICOTECHNICAL PROBLEMS OF WEIGHTLESSNESS [NEKOTORYE FIZIKO-TEKHNICHESKIE PROBLEMY NEVESOMOSTI].

R. A. Stasevich.

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI].

Edited by V. V. Parin and I. I. Kas'ian

Moscow, Izdatel'stvo Meditsina, 1968, p. 7-20. In Russian.

Discussion of the physical meaning of the concept of weightlessness. The states of dynamic and static weightlessness are defined. Cohesive forces, surface tension, and the mechanical behavior of fluids during weightlessness are considered. Suggestions for handling fluids during weightlessness are given. Techniques for creating and simulating weightlessness under conditions other than those occurring during space flights are described and assessed. V. Z.

A69-18569

PRELIMINARY DATA CONCERNING PHYSIOLOGICAL STUDIES RELATING TO MANNED SPACE FLIGHT [PERVYE DANNYE O FIZIOLOGICHESKIKH ISSLEDOVANIYAKH PRI POLETE CHELOVEKA V KOSMOS]

Iu. M. Volynkin, V. V. Parin, and V. I. Iazdovskii

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V. V. Parin and I. I. Kas'ian

Moscow, Izdatel'stvo Meditsina, 1968, p. 23, 24. In Russian.

Brief review of the general rules adopted in the selection of prospective cosmonauts in the Soviet Union and of the physiological studies carried out during the preparation of cosmonauts Gagarin and Titov for their space flights. The normal adaptive heart-beat and respiratory reactions of both cosmonauts to accelerations and

weightlessness are mentioned. It is stressed that provisions for active future creative activity are basic in the preflight training of Soviet cosmonauts. V. Z.

A69-18570

REACTIONS OF COSMONAUTS UNDER CONDITIONS OF WEIGHTLESSNESS [REAKTSII KOSMONAVTOV V USLOVIYAKH NEVESOMOSTI].

I. I. Kas'ian, V. I. Kopanev, and V. I. Iazdovskii

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V. V. Parin and I. I. Kas'ian

Moscow, Izdatel'stvo Meditsina, 1968, p. 52-64. 41 refs. In Russian.

Analysis of the physiological reactions of cosmonauts Gagarin, Titov, Nikolaev, Popovich, Bykovskii, and Tereshkova during 35-sec periods of weightlessness on aircraft describing Keplerian parabolas, and during prolonged weightlessness on orbiting Vostok spacecraft. The EKG, the arterial pressure, and the heart beat and respiration rates of the cosmonauts, as well as the coordination of their motion during writing tests and work on a coordinograph, were recorded on TV. The various functional changes established in the cosmonauts during flights are discussed and are characterized as tending to adjust their organisms to weightlessness. V. Z.

A69-18571

CERTAIN DATA CONCERNING THE CONDITIONS OF THE COSMONAUTS DURING THE FLIGHT OF THE FIRST SPACE EXPEDITION ON THE VOSKHOD SPACECRAFT [NEKOTORYE DANNYE O SOSTOYANII KOSMONAVTOV VO VREMIA POLETA Pervoi KOSMICHESKOI EKSPEDITSII NA KORABLE "VOSKHOD"].

Iu. M. Volynkin, I. T. Akulnichev, P. V. Vasil'ev, A. D. Voskresenskii, I. I. Kas'ian, and D. G. Maksimov

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI].

Edited by V. V. Parin and I. I. Kas'ian.

Moscow, Izdatel'stvo Meditsina, 1968, p. 65-76. 13 refs. In Russian.

Discussion of the results of physiological and medical tests performed on cosmonauts Komarov, Feoktistov, and Egorov by the latter, or transmitted by a TV system, during the orbital flight of the cosmonauts on the Voskhod spacecraft. The tests were designed to assess the functional state of the central nervous system, the physical fitness, the functioning of the cardiovascular and respiratory systems, the functioning of the analysors, and the quality of the prescribed work/rest schedule of the crew. The automatic recording systems used are described. The changes established in the functional state of the cosmonauts were temporary and not of pathological nature. V. Z.

A69-18572

GRAVITATIONAL EFFECTS DURING THE FORMATION OF FUNCTIONS OF THE ORGANISM [GRAVITatsIONNYE VOZDEISTVIA V FORMIROVANII FUNKTSII ORGANIZMA]

P. K. Isakov, E. M. Iuganov, and I. I. Kas'ian.

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V. V. Parin and I. I. Kas'ian.

Moscow, Izdatel'stvo Meditsina, 1968, p. 84-88. 7 refs. In Russian.

Discussion of variations in gravity as a factor in the formation of physiological functions of the human organism. Published results on gravity perception, electrical activity of "antigravitational" muscles and gas metabolism during weightlessness are reviewed. Increased gas metabolism during acceleration is noted. It is concluded that the rearrangement of the myogenic tonus aimed at maintaining the body in its original position is one of the primary responses of the human organism to gravitational effects. V. Z.

A69-18573 #

PHYSIOLOGICAL ASPECTS OF THE WEIGHTLESSNESS PROBLEM
[FIZIOLOGICHESKIE ASPEKTY PROBLEMY NEVESOMOSTI]

I I Kas'ian and V I Kapanev

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V V Parin and I I Kas'ian

Moscow, Izdatel'stvo Meditsina, 1968, p 94-110 92 refs In Russian

Generalization of the literature data for the period from 1964 to 1965 concerning the influence of weightlessness on the human organism, with particular reference to the investigations performed and the experience obtained by Soviet cosmonauts and American astronauts. It is shown that, in spite of the considerable progress that has been achieved in this field, there are still many unresolved problems which require additional investigations. One approach should be based on generalizing available data and formulating general theories of the influence of weightlessness on the human organism. Another approach is to further our knowledge concerning the functional state of the organism under weightlessness conditions, as well as our knowledge of the biochemical changes and the changes at the cellular level.

V P

A69-18574 #

REACTIONS OF HUMANS TO SHORT-TERM WEIGHTLESSNESS
[REAKTSII LIUDEI PRI KRATKOVREMENNOI NEVESOMOSTI]

L A Kitaev-Smyk

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V V Parin and I I Kas'ian.

Moscow, Izdatel'stvo Meditsina, 1968, p 113-119. 10 refs In Russian

Discussion of the subjective sensory reactions experienced by a group of 270 subjects, with or without a flying background, during sequences of 20 to 30-sec periods of weightlessness produced by special maneuvers of aircraft. It is concluded that the subjects can be grouped according to their reactions into those with good, satisfactory, and low endurance and those rejecting weightlessness completely.

V Z

A69-18575 #

SENSORY REACTIONS AND THE STATE OF ARBITRARY MOTIONS OF MAN UNDER CONDITIONS OF WEIGHTLESSNESS [SENSORNYE REAKTSII I SOSTOIANIE PROIZVOL'NYKH DVIZHENII CHELOVEKA V USLOVIAKH NEVESOMOSTI].

E M Iuganov, I I Kas'ian, N N Gurovskii, A I Konovalov, B. A Iakubov, and V I Iazdovskii.

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V V Parin and I I Kas'ian

Moscow, Izdatel'stvo Meditsina, 1968, p. 120-126 12 refs In Russian

Investigation of the sensory reactions and arbitrary motions of a group of 39 subjects during parabolic jet flights with brief periods of weightlessness. The precision of purposeful muscular endeavors, the coordination of writing motions, and the coordination of motions for eating and drinking are studied specifically. The subjective physical sensations experienced by the subjects during weightlessness are described. It is concluded that 35 to 40-sec periods of weightlessness did not affect the general condition of the subjects and produced no unfavorable sensory reactions in them.

V Z

A69-18576 #

REACTIONS OF THE CARDIOVASCULAR AND RESPIRATORY SYSTEMS OF ANIMALS DURING FLIGHTS IN SEALED COMPARTMENTS OF ROCKETS TO AN ALTITUDE OF 212 KM [REAKTSII SERDECHNO-SOSUDISTOI I DYKHATEL'NOI SISTEMY ZHIVOTNYKH PRI POLETAKH V GERMETICHESKIKH KABINAKH RAKET DO VYSOTY 212 KM]

I I Kas'ian

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V V Parin and I I Kas'ian

Moscow, Izdatel'stvo Meditsina, 1968, p 129-142 5 refs. In Russian

Investigation of the reactions of the cardiovascular system of six dogs confined in sealed biocompartments of ballistic missiles launched to an altitude of 212 km and recovered during 12 experiments carried out in 1955, 1958, 1959, and 1960. The biopotential of the myocardium, the arterial pressure, the respiration rates, and the EKGs of the dogs, and the barometric pressure and the air temperature in the biocompartments were recorded on TV during the flights. Increased blood pressure and increased heart beat and respiration rates during the accelerating and braking positions of the flights were established in the dogs.

V Z

A69-18577 #

CERTAIN PHYSIOLOGICAL REACTIONS OF ANIMALS DURING FLIGHTS IN BIOCOMPARTMENTS OF BALLISTIC ROCKETS TO ALTITUDES OF 450 TO 473 KM [NEKOTORYE FIZIOLOGICHESKIE REAKTSII ZHIVOTNYKH PRI POLETAKH V BIOKABINAKH BALLISTICHESKIKH RAKET DO VYSOTY 450-473 KM]

I I Kas'ian

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V V Parin and I I Kas'ian.

Moscow, Izdatel'stvo Meditsina, 1968, p 143-153 14 refs In Russian

Investigation of the effects of 9 to 10-min periods of acceleration and dynamic weightlessness on the physiological functions of intact dogs carried by ballistic missiles to altitudes of 450 to 473 km and recovered in six experiments conducted in 1957 and 1958. The biopotentials of the myocardium, the blood pressure, the respiration rates, and the carotid artery pulsations of the dogs were recorded on TV, and their motor activity during flight was photographed by a motion picture camera with a short focal length. It was found that all the dogs endured the ballistic missile flights satisfactorily.

V Z

A69-18578 #

PHYSIOLOGICAL REACTIONS OF ANIMALS DURING FLIGHTS ON THE THIRD, FOURTH, AND FIFTH SPACECRAFT SATELLITES [FIZIOLOGICHESKIE REAKTSII ZHIVOTNYKH PRI POLETAKH NA TRET'EM, CHETVERTOM I PIATOM KOSMICHESKIKH KORABLI-AKH-SPUTNIKAKH]

O G Gizenko, I I Kas'ian, A R Kotovskaia, and V. I Iazdovskii.

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V V Parin and I I Kas'ian.

Moscow, Izdatel'stvo Meditsina, 1968, p 154-167. 19 refs In Russian

Discussion of EKGs, phonocardiograms, sphygmograms, heart beat and respiration rates, body temperature, and motor activity recorded or transmitted by TV during orbital flights of four dogs confined in the biological capsules of the Soviet third, fourth, and fifth spacecraft satellites. Temporary, reversible changes in the heart beat and respiration rates during ascent and descent, but no pathological reactions of any function during any phase of the flight, were established in the dogs.

V Z

A69-18579 #

CERTAIN PHYSIOLOGICAL REACTIONS OF MAN UNDER CONDITIONS OF INTERMITTENT ACCELERATIONS AND SHORT-TERM WEIGHTLESSNESS [NEKOTORYE FIZIOLOGICHESKIE REAKTSII CHELOVEKA V USLOVIAKH PEREMEZHAISHCHEGOSIA VLIANIYA PEREGRUZOK I KRATKOVREMENNOI NEVESOMOSTI]

I I Kas'ian

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI].

A69-18580

Edited by V. V. Parin and I. I. Kas'ian

Moscow, Izdatel'stvo Meditsina, 1968, p. 168-178. In Russian.

Statistical study of the heart beat, respiration rate, and arterial pressure in a group of 55 healthy male subjects, 22 to 43 years old. The study was carried out during a total of 40 flights on fighter aircraft, with 35 to 45-sec periods of weightlessness, and during a total of 38 flights on a laboratory aircraft, with 20 to 25-sec periods of weightlessness. Only brief and reversible fluctuations in cardiovascular and respiratory functions were established during intermittent accelerations and short-term weightlessness experienced by the subjects during these flights. V. Z.

A69-18580

REACTIONS OF COSMONAUTS DURING PARABOLIC AIRCRAFT FLIGHTS [REAKTSII KOSMONAVTOV VO VREMIA PARABOLICHESKIKH POLETOV NA SAMOLETAKH]

I. I. Kas'ian, I. A. Kolosov, V. I. Lebedev, and B. N. Iurov. IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI].

Edited by V. V. Parin and I. I. Kas'ian

Moscow, Izdatel'stvo Meditsina, 1968, p. 179-189. 26 refs. In Russian.

Review of sensory and physiological reactions experienced by cosmonauts Nikolaev, Popovich, Bykovskii, Tereshkova, Komarov, Feoktistov, Egorov, Gagarin, and Titov during parabolic training flights on aircraft in preparation for orbital flights. Tabulated heart beat and respiration rate, arterial pressure, and coordinograph data are given for the cosmonauts. Their subjective sensations during parabolic aircraft flights are also described. V. Z.

A69-18581

CERTAIN PHYSIOLOGICAL REACTIONS IN HUMANS UNDER CONDITIONS OF BRIEF WEIGHTLESSNESS [NEKOTORYE FIZIOLOGICHESKIE REAKTSII CHELOVEKA V USLOVIYAKH KRATKOVREMENNOI NEVESOMOSTI]

I. I. Kas'ian, A. S. Krasovskii, I. A. Kolosov, M. A. Lomova, V. I. Lebedev, and B. N. Iurov.

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V. V. Parin and I. I. Kas'ian

Moscow, Izdatel'stvo Meditsina, 1968, p. 190-200. 16 refs. In Russian.

Investigation of the vestibular reactions of a group of 31 healthy subjects belonging to various professions, during 40 to 45-sec periods of weightlessness preceded and followed by accelerations in a total of 120 parabolic jet flights. The electroencephalograms, the biopotentials of the myocardium, the respiration rates, and the vestibular-coordination reactions recorded during the flights are discussed. V. Z.

A69-18582

PHYSIOLOGICAL REACTIONS OF COSMONAUTS IN UNSUPPORTED SPACE [FIZIOLOGICHESKIE REAKTSII KOSMONAVTOV V BEZOPORNOM PROSTRANSTVE]

I. I. Kas'ian, I. A. Kolosov, V. I. Kopanov, and V. I. Lebedev.

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V. V. Parin and I. I. Kas'ian.

Moscow, Izdatel'stvo Meditsina, 1968, p. 214-224. 7 refs. In Russian.

Discussion of the physiological reactions of cosmonauts Beliaev and Leonov while leaving and entering a simulated dummy spacecraft aboard an airborne laboratory performing parabolic flights with 25 to 30-sec periods of weightlessness. The cosmonauts developed increased heart beat and respiration rates and a higher blood pressure, which subsided during repeated periods of weightlessness, and a reduction of postrotational nystagmus, as was observed during the preflight training of other cosmonauts. V. Z.

A69-18583

REACTIONS OF THE CARDIOVASCULAR SYSTEM OF MAN AND ANIMALS UNDER CONDITIONS OF WEIGHTLESSNESS [REAKTSII SERDECHNO-SOSUDISTOI SISTEMY CHELOVEKA I ZHIVOTNYKH V USLOVIYAKH NEVESOMOSTI]

R. M. Baevskii and O. G. Gizenko.

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI].

Edited by V. V. Parin and I. I. Kas'ian.

Moscow, Izdatel'stvo Meditsina, 1968, p. 234-244. 14 refs. In Russian.

Results of phonocardiographic, sphygmographic, arteriooscillographic, seismocardiographic, and EKG studies of dogs, and kinetocardiographic, seismocardiographic, and EKG studies of cosmonauts Titov, Nikolaev, Popovich, Bykovskii, and Tereshkova, carried out during orbital flights. The highly complex reactions of the cardiovascular system to weightlessness are discussed in general terms. The major role played by the vagus nerve in adjusting the organism to weightlessness is noted. It is also found that the adjustment processes generally tend to diminish the energy consumption and reduce the metabolic processes occurring in the muscles. V. Z.

A69-18584

REACTIONS OF THE CARDIOVASCULAR AND RESPIRATORY SYSTEMS OF COSMONAUTS UNDER CONDITIONS OF ORBITAL FLIGHT ON THE VOSKHOD SPACECRAFT [REAKTSII SERDECHNO-SOSUDISTOI I DYKHATEL'NOI SISTEMY KOSMONAVTOV V USLOVIYAKH ORBITAL'NOGO POLETA NA KOSMICHESKOM KORABLE "VOSKHOD"]

P. V. Vasil'ev, A. D. Voskresenskii, I. I. Kas'ian, D. G.

Maksimov, I. D. Pestov, and N. A. Chekhonadskii.

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V. V. Parin and I. I. Kas'ian

Moscow, Izdatel'stvo Meditsina, 1968, p. 260-267. 12 refs. In Russian.

Attempt to establish a statistical correlation between the cardiac activity and respiration dynamics in cosmonauts Komarov, Feoktistov, and Egorov during their orbital flight on the Voskhod spacecraft. Curves of mean heart beat rates and mean respiration rates of the cosmonauts are plotted for individual orbits on the basis of statistically treated EKG and pneumogram recordings. V. Z.

A69-18585

CERTAIN REACTIONS OF THE CARDIOVASCULAR AND RESPIRATORY SYSTEMS OF COSMONAUTS DURING ORBITAL FLIGHT ON THE VOSKHOD 2 SPACECRAFT [NEKOTORYE REAKTSII SERDECHNO-SOSUDISTOI I DYKHATEL'NOI SISTEMY KOSMONAVTOV V ORBITAL'NOM POLETE NA KOSMICHESKOM KORABLE "VOSKHOD 2"]

I. I. Kas'ian, P. V. Vasil'ev, D. G. Maksimov, I. T. Akulmichev,

A. E. Uglov, A. E. Baikov, and N. A. Chekhonadskii.

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V. V. Parin and I. I. Kas'ian

Moscow, Izdatel'stvo Meditsina, 1968, p. 268-279. 10 refs. In Russian.

General review of the condition of the cardiovascular and respiratory systems of cosmonauts Beliaev and Leonov during the Voskhod 2 orbital flight. EKGs and pneumograms are used to determine heart beat and respiration rates and the systolic index. Totals of 100 to 200 heart beat cycles and 25 to 40 respiratory cycles per orbit are used in statistical series for calculations. More pronounced reactions, largely emotional, are established in both cosmonauts, in Leonov during his space walk in the second orbit, and in Beliaev during the performance of manual control in the seventeenth orbit. V. Z.

A69-18586

SENSITIVITY OF THE VESTIBULAR ANALYSOR AND SENSORY REACTIONS OF MAN DURING SHORT-TERM WEIGHTLESSNESS

[CHUVSTVITEL'NOST' VESTIBULIARNOGO ANALIZATORA I SENSORNYE REAKTSII CHELOVEKA PRI KRATKOVREMENNOI NEVESOMOSTI]

E. M. Iuganov, I. A. Sidel'mkov, A. I. Gorshkov, and I. I. Kas'ian
IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V. V. Parin and I. I. Kas'ian
Moscow, Izdatel'stvo Meditsina, 1968, p. 298-304. 7 refs. In Russian.

Investigation of the vestibular and sensory reactions of a group of 30 persons subjected to rotation and rocking tests, cumulative Coriolis accelerations, and inhibition of vestibular reactions on a ground test stand. It is concluded that the effects of brief weightlessness on man depend noticeably on the individual sensitivity of the subject, but can be predicted to a certain measure by ground tests.

V. Z.

A69-18587

VESTIBULAR-VEGETATIVE REACTIONS UNDER THE ACTION OF ANGULAR AND CORIOLIS ACCELERATIONS UNDER CONDITIONS OF WEIGHTLESSNESS [O VESTIBULO-VEGETATIVNYKH REAKTSIIKHX PRI VOZDEISTVII UGLOVYKH I KORIOLISOVYKH USKORENIY V USLOVIYAKH NEVESOMOSTI]

E. M. Iuganov, E. V. Lapaev, and V. A. Degtiarev.
IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V. V. Parin and I. I. Kas'ian.
Moscow, Izdatel'stvo Meditsina, 1968, p. 305-310. 9 refs. In Russian.

Study of the vestibular-vegetative reactions of a group of seven subjects during angular and Coriolis accelerations alternating with 24 to 26-sec periods of weightlessness, as observed in a total of 80 experiments in a total of 25 flights of an airborne laboratory. The results of tachoscillographic, kinetocardiographic, and EKG recordings obtained during the experiments are discussed. Increased parasympathetic and sympathetic activity under the action of angular and Coriolis accelerations is noted.

V. Z.

A69-18588

VESTIBULAR REACTIONS OF COSMONAUTS DURING THE FLIGHT ON THE VOSKHOD SPACECRAFT [VESTIBULIARNYE REAKTSII KOSMONAVTOV PRI POLETE NA KORABLE "VOSKHOD"]

E. M. Iuganov, A. I. Gorshkov, I. I. Kas'ian, I. I. Brianov, I. A. Kolosov, V. I. Kopanov, V. I. Lebedev, N. I. Popov, and F. A. Solodovnik.

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V. V. Parin and I. I. Kas'ian.
Moscow, Izdatel'stvo Meditsina, 1968, p. 311-317. 8 refs. In Russian.

Discussion of the vestibular function of cosmonauts Komarov, Feoktistov, and Egorov as recorded during their preflight training and flight on the Voskhod spacecraft. The vestibular-sensory, motor, and vegetative reactions of the cosmonauts during weightlessness, including writing tests and measurement of the sensitivity to galvanic current, are evaluated. Tabulated values of the heart beat and respiration rates of the cosmonauts and their writing test ratings are given. The vestibular stability of the cosmonauts was found to depend on the completeness of their preflight vestibular training, and was higher in Komarov, whose preflight vestibular training was more complete than that of Feoktistov and Egorov.

V. Z.

A69-18589

FUNCTIONAL FEATURES AND INTERACTION BETWEEN THE OTOLITH AND CUPULAR APPARATUS OF THE VESTIBULAR ANALYSOR OF MAN UNDER CONDITIONS OF ALTERED GRAVITATION [K PROBLEME OSOBENNOSTEI FUNKTSII I VZAIMODEISTVIA OTOLITOVOGO I KUPULIARNOGO APPARATOV VESTIBULIARNOGO ANALIZATORA CHELOVEKA V USLOVIYAKH IZMENENNOI VESOMOSTI]

E. M. Iuganov.

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V. V. Parin and I. I. Kas'ian.
Moscow, Izdatel'stvo Meditsina, 1968, p. 318-330. 22 refs. In Russian.

Discussion of the results of a total of 33 experiments carried out in a study of the functional state of the otolith apparatus of individuals subjected to centrifuging. A reduction of the postrotational nystagmus during weightlessness is established in all experiments. It is concluded that weightlessness does not lead to a physiological delabyrinthation of the otolith apparatus but produced a "minus" stimulus.

V. Z.

A69-18590

MYOGENIC TONUS UNDER CONDITIONS OF WEIGHTLESSNESS [O MYSHECHNOM TONUSE V USLOVIYAKH NEVESOMOSTI]

E. M. Iuganov, I. I. Kas'ian, and V. I. Lazdovski.
IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V. V. Parin and I. I. Kas'ian.
Moscow, Izdatel'stvo Meditsina, 1968, p. 341-346. 5 refs. In Russian.

Investigation of the tonus of the oculomotor muscle of a rabbit during a rocket flight with accelerations of up to 6.5 g and a 5-min period of weightlessness. Photographs taken during the experiment indicated a distinct change in the direction of the displacement of the left eye of the rabbit during acceleration and weightlessness. It is believed that the vertical displacement of the eye during flight indicates that the tonus of the oculomotor muscle becomes lower during weightlessness.

V. Z.

A69-18591

BIOELECTRIC ACTIVITY OF SKELETAL MUSCLES UNDER CONDITIONS OF ALTERNATING PERIODS OF ACCELERATION AND WEIGHTLESSNESS [BIOELEKTRICHESKAYA AKTIVNOST' SKELETNOY MUSKULATURY V USLOVIYAKH PEREMEZHAUSHCHEGOSIA DEISTVIA PEREGRUZOK I NEVESOMOSTI]

E. M. Iuganov, I. I. Kas'ian, and B. F. Asiamolov.
IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V. V. Parin and I. I. Kas'ian.
Moscow, Izdatel'stvo Meditsina, 1968, p. 347-354. In Russian.

Study of the bioelectric activity of the skeletal muscles of intact dogs and rabbits, and decerebrated and delabyrinthated cats under the effects of alternating accelerations and weightlessness during parabolic aircraft flights and vertical rocket flights. Also recorded are the biocurrents of the cervical, spinal, and femoral muscles of a group of individuals during aircraft flights. A distinct decrease in the bioelectric activity of skeletal muscles during weightlessness is noted.

V. Z.

A69-18592

CERTAIN REACTIONS OF MAN UNDER CONDITIONS OF REDUCED GRAVITATION [O NEKOTORYKH REAKTSIIKHX CHELOVEKA V USLOVIYAKH PONIZHENNOI VESOMOSTI]

I. I. Kas'ian, M. A. Cherepakhin, and A. I. Gorshkov.
IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V. V. Parin and I. I. Kas'ian.
Moscow, Izdatel'stvo Meditsina, 1968, p. 361-366. In Russian.

Onboard investigation of the sensory and motor activity of a group of 26 subjects exposed to reduced gravitation during aircraft motions along parabolic trajectories. The muscular strength of the wrist was measured on a visually controlled dynamometer, and the biocurrents of the thumb muscles were recorded by an oscillograph. Negative changes in the general condition, leading to temporary incapacitation with nausea and vomiting in the more severe cases, were observed in some members of the group. Electromiograms of the wrist muscles were plotted, showing changes in the bioelectric activity during horizontal flights and periods of weightlessness.

V. Z.

A69-18593 #

COORDINATION OF POSTURE AND MOTION OF MAN UNDER CONDITIONS OF INCREASED AND DECREASED GRAVITATION [KOORDINATSIYA POZY I DVIZHENIYA CHELOVEKA V USLOVIAKH POVYSHENNOI I PONIZHENNOI GRAVITATSII].

V S Gurfinkel', P K Isakov, V B Malkin, and V I Popov
IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V V Parin and I I Kas'ian

Moscow, Izdatel'stvo Meditsina, 1968, p. 355-360 In Russian

Investigation of the postural activity of the muscles in maintaining positions of upper extremity limbs with respect to each other, in a group of seven healthy persons subjected to 2 to 3-sec accelerations of 0.3 to 2 g in a high-speed elevator at Moscow University. Also studied were the equilibrium-preserving motor reactions of freely standing subjects, and the purposeful motions of subjects trying to keep the hand of a measuring instrument in a given position. It was found that the posture and motion control functions of the subjects were not essentially affected by increases and decreases in gravity. V Z

A69-18594 #

OCULOMOTOR ACTIVITY OF COSMONAUTS DURING ORBITAL FLIGHTS [GLAZODVIGATEL'NAIA AKTIVNOST' U KOSMONAVTOV VO VREMIA ORBITAL'NYKH POLETOV]

I T Akulimichev, M D Emel'ianov, and D G Maksimov

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V V Parin and I I Kas'ian

Moscow, Izdatel'stvo Meditsina, 1968, p. 367-370 9 refs

In Russian

Analysis of electrooculograms taken during special vestibular tests performed by cosmonauts Nikolaev, Popovich, Bykovskii, and Tereshkova during their orbital flights. Persisting changes in the coordination of eye motions were not established in the four cosmonauts during the 4- to 5-day orbital flights. The brief changes shown by Popovich and Tereshkova are attributed to an active adaptation process in their central nervous systems. V Z

A69-18595 #

MOTOR REACTIONS UNDER CONDITIONS OF WEIGHTLESSNESS [DVIGATEL'NYE REAKTSII V USLOVIAKH NEVESOMOSTI]

I I Kas'ian, V I Kopanev, and E M Iuganov

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V V Parin and I I Kas'ian

Moscow, Izdatel'stvo Meditsina, 1968, p. 371-383 46 refs In Russian

General consideration of human motor reactions during weightlessness, based on a review of published space flight observations. The experiences of cosmonaut Bykovskii in writing during short periods of weightlessness are discussed specifically. It is concluded that states of weightlessness during parabolic or orbital flights do not essentially affect the motor activity and physical efficiency of man. The observed insignificant alterations in motor performance are linked to functional deviations in the analyzers. V Z

A69-18596 #

EFFICIENCY OF MAN UNDER CONDITIONS OF REDUCED GRAVITATION [K VOPROSU O RABOTOSPOSOBNOSTI CHELOVEKA V USLOVIAKH PONIZHENNOI VESOMOSTI]

A V Eremin, I I Kas'ian, I A Kolosov, V I Kopanev, and V I Lebedev

IN: MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V V Parin and I I Kas'ian

Moscow, Izdatel'stvo Meditsina, 1968, p. 405-409 12 refs. In Russian

Discussion of the efficiency of space-flight crews, according

to the experience of Soviet cosmonauts Feoktistov, Egorov, and Titov. General considerations are presented concerning the alleviation of the harmful effects of prolonged weightlessness on human efficiency. Possible positive approaches to this problem are seen in the preflight adaptation of astronauts to weightlessness and in the technological improvement of space vehicles and their equipment. V Z

A69-18597 #

RESULTS OF BIOLOGICAL EXPERIMENTS CONDUCTED UNDER FLIGHT CONDITIONS ON THE VOSTOK SPACECRAFT WITH THE PARTICIPATION OF COSMONAUTS A G NIKOLAEV, P R POPOVICH, AND V F BYKOVSKII [REZUL'TATY BIOLOGICHESKIKH EKSPERIMENTOV, PROVEDENNYKH V USLOVIAKH POLETA NA KORABLIKH "VOSTOK" S UCHASTIEM KOSMONAVTOV A G NIKOLAEVA, P R POPOVICH I V F BYKOVSKOGO]

V V Antipov, N L Delone, G P Parfenov, and V G Vysotskii

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI].

Edited by V V Parin and I I Kas'ian

Moscow, Izdatel'stvo Meditsina, 1968, p. 445-453 7 refs In Russian

Discussion of the results of experiments dealing with the reproductive behavior of *Drosophila melanogaster* flies and the hereditary properties of *Tradescantia paludosa* plants, carried out during the Vostok 3 and 4 space flights with the participation of the crew members. It is found that a state of weightlessness lasting up to four days has no appreciable effects on the biological cycle of this fly. Certain changes in the chromosome patterns of the plants are indicated. V Z

A69-18598 #

EFFECT OF SPACE FLIGHT FACTORS ON THE FREQUENCY OF RECESSIVE LETHAL SEX-RELATED MUTATIONS IN *DROSOPHILA MELANOGASTER* [VLIANIE FAKTOROV KOSMICHESKOGO POLETA NA CHASTOTY VOZNIKNOVENIYA STEPLENNYKH S POLOM RETSESSIVNYKH LETAL'NYKH MUTATSII U *DROSOPHILA MELANOGASTER*]

Ia L Glembofskii, Iu A Lapkin, G P Parfenov, and E M Kamshilova

IN MEDICOBIOLOGICAL STUDIES IN WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIA V NEVESOMOSTI]

Edited by V V Parin and I I Kas'ian

Moscow, Izdatel'stvo Meditsina, 1968, p. 454-461. 10 refs In Russian

Discussion of the frequency of recessive lethal mutations in the gametes of male and female *Drosophila melanogaster* carried by the Vostok 3 and 4 spacecraft. A study of the insects revealed no effect of the flight conditions on these mutations. Also, no statistically reliable changes could be established in their chromosomes after the flight. V Z

A69-18629 *

RELATIONSHIP BETWEEN INTRARENAL HYDROSTATIC PRESSURE AND HEMODYNAMICALLY INDUCED CHANGES IN SODIUM EXCRETION

Joseph A. Martino (Boston City Hospital, Second and Fourth Medical Services, Thorndike Memorial Laboratory, Harvard University, Harvard Medical School, Dept of Medicine, Boston, Mass.) and Laurence E. Earley (California, University, San Francisco Medical Center, Dept of Medicine, San Francisco, Calif.) Circulation Research, vol 23, Sept 1968, p. 371-386 19 refs PHS Grant No. AM-5401-06, Grants No. NSG-595, No. NGR-22-007-019.

Investigation of the proposal that physically induced changes in sodium reabsorption may be mediated by changes in Starling forces across the capillary. Renal vasodilatation produced natriuresis associated with immediate increases in intrarenal venous pressure

Increased arterial pressure was accompanied by further natriuresis and initially increased intrarenal pressure in vasodilated kidneys. Plasma load was always accompanied by increased intrarenal venous pressure. Saline loading usually increased intrarenal venous pressure, and restoration of plasma protein concentration during saline loading reduced, but did not abolish, natriuresis. This continued natriuresis was associated with reduced renal vascular resistance and increased intrarenal venous pressure. The observations support the hypothesis that changes in peritubular capillary hydrostatic pressure initiate changes in tubular sodium reabsorption as a result of changes in capillary uptake. G R

A69-18632 *

TRUTH AND FALSITY OF VERBAL STATEMENTS AS CONDITIONED STIMULI IN CLASSICAL AND DIFFERENTIAL EYELID CONDITIONING

Robert A. Fleming (U. S. Naval Material Command, Naval Command and Control Communications Center, San Diego, Calif.), David A. Grant, and Jane A. North (Wisconsin, University, Madison, Wis.)

Journal of Experimental Psychology, vol. 78, no. 1, 1968, p. 178-180

PHS Grant No. MH 06792, Grant No. NGL-50-002-001

Investigation of the phenomena of classical and differential conditioning when the differential stimulus was the truth or falsity of a visually presented verbal statement. The eyelid responses of 120 subjects were differentially conditioned to visually presented true and false statements. Each conditioned stimulus was different, and the differential cue was the truth or falsity of the statement. True statements evoked more conditioned responses than false statements when all were reinforced in a mixed series. G. R.

A69-18634 *

INTRINSIC AND INDUCED EEG RHYTHMS IN SEVERE HYPOTHYROIDISM SECONDARY TO PANHYPOTUITARISM - A CASE REPORT.

John S. Barlow (Massachusetts General Hospital, Neurophysiology Laboratory of the Neurology Service, Boston, Massachusetts Institute of Technology, Research Laboratory of Electronics, Center for Communication Sciences, Cambridge, Mass.)

Electroencephalography and Clinical Neurophysiology, vol. 22, 1967, p. 266-269. 14 refs.

Research supported by the Joint Services Electronics Program, NSF Grant No. GK-835, NIH Grant No. MH-04737-06, PHS Grant No. NB-03752, Grants No. NSG-496, No. NGL-22-009-019.

Description of EEG findings and psychometric data for a patient with unusually severe hypothyroidism, secondary to panhypopituitarism. Changes in the resting EEG and in the parieto-occipital response evoked by slowly repeated flashes are reported in this case. Parallel improvements are noted in the resting EEG, in the phenomenon of rhythmic after-discharge induced by photic stimulation, and in the patient's mental status. G R

A69-18636 *

CUE SELECTION IN PAIRED-ASSOCIATE AND CONCEPT-LEARNING PARADIGMS

David A. Grant (Wisconsin, University, Madison, Wis.) and Neal E. A. Kroll

Journal of Verbal Learning and Verbal Behavior, vol. 7, 1968, p. 64-71. 5 refs.

PHS Grant No. MH 06792, Grant No. NGL-50-002-001

In an instrumental reward experiment using the concept-learning paradigm with word-color compounds as stimuli, over half of the subjects selected color as the functional stimulus, and the functional stimulus selected could be predicted from a simple generalization test. A second experiment replicated the paired-associates experiment of Saufley and Underwood (1964) in finding the word to be the more frequently selected and more efficient cue, but color appeared to be more important than has been implied by earlier work. A third experiment, investigating the consequences

of numerous procedural differences between the first two, showed that word was the superior functional stimulus when the paired-associates paradigm with each stimulus associated with a response was used. But when the concept learning paradigm with several stimuli paired with each response was used, color was more frequently selected and performance was equally good with word or color as the functional stimulus. (Author)

A69-18637 *

ARITHMETIC CORRECTNESS AS THE DISCRIMINANDUM IN CLASSICAL AND DIFFERENTIAL EYELID CONDITIONING

Robert A. Fleming, David A. Grant, Jane A. North, and C. Michael Levy (Wisconsin, University, Madison, Wis.)

Journal of Experimental Psychology, vol. 77, no. 2, 1968, p. 286-294. 20 refs.

PHS Grant No. MH 06792, Grant No. NGL-50-002-001

Study of the phenomena of classical and differential conditioning when the differential stimulus was the "truth value" of arithmetic problems. The eyelid responses of 160 subjects were differentially conditioned to simple arithmetic problems presented visually. Each problem conditioned stimulus was different, and the differential cue was whether the problem was correctly or incorrectly solved. In addition 20 subjects were reinforced with the air puff unconditioned stimulus for both right and wrong problems. The "truth value" of the problems served as a good differential stimulus and the conditioned discrimination transferred differentially to the words "right" or "wrong" which were associated with the reinforced class of problems. G. R.

A69-18907

CONTROL/DISPLAY LOCATION CODING

Michael V. Fiore (International Business Machines Corp., Office Products Div.)

Instruments and Control Systems, vol. 42, Jan. 1969, p. 71, 72.

Study of the design of control-display panels conducive to fast accurate control response with modern electronic and mechanical equipment. A reliable correspondence between the location of the display stimulus and the location of the control response is found to exist when displays are grouped in rows of columns, with the corresponding controls arranged in a perpendicular line. Operators associate the top control in a column with the left display in a corresponding row, or the top display in a column with the left control in a corresponding row. When controls and displays are arranged in a rectangular configuration, with controls on two adjacent sides and corresponding displays on the opposite sides, a marked preference is shown for associating controls and displays that are directly opposite one another. P v T

A69-18943

THE EFFECT OF A VACUUM AND RADIATION ON MICROORGANISMS [ZUR WIRKUNG VON VAKUUM UND STRAHLUNG AUF MIKROORGANISMEN].

H. Bücker and G. Horneck (Frankfurt, Universität, Arbeitsgruppe für biophysikalische Weltraumforschung, Frankfurt am Main, West Germany).

IN DEUTSCHE GESELLSCHAFT FÜR BIOPHYSIK UND ÖSTERREICHISCHE GESELLSCHAFT FÜR REINE UND ANGEWANDTE BIOPHYSIK, JOINT ANNUAL SESSION, BADEN BEI WIEN, AUSTRIA, SEPTEMBER 1968, PROCEEDINGS [DEUTSCHE GESELLSCHAFT FÜR BIOPHYSIK UND ÖSTERREICHISCHE GESELLSCHAFT FÜR REINE UND ANGEWANDTE BIOPHYSIK, GEMEINSAME JAHRESTAGUNG, BADEN BEI WIEN, AUSTRIA, SEPTEMBER 1968, PROCEEDINGS].

Vienna, Verlag der Wiener Medizinischen Akademie, 1968, p. 229-235. 11 refs. In German.

Research supported by the Bundesministerium für Wissenschaftliche Forschung.

Investigation of microorganisms in a vacuum, subjected to irradiation by beams that are absorbed in the atmosphere or to freeze-

drying Microorganisms in extraterrestrial biophysics and exobiology are also considered The main goal in the first two cases was the highest possible survival rate For this reason highly resistant cells (spores) were used, or else protective materials, such as skim milk, ascorbic acid, etc were used in the evacuation process The results show that in the case of *E. coli* B/r, cell damage resulting from exposure in a vacuum of up to 2×10^{-6} torr was due mainly to dehydration The combined effects of inactivation, delay of initial cell division, and increased radiation sensitivity were induced by evacuation at approximately 1 torr and did not increase appreciably during further decompression Cells in the interior of protective layers of bacteria, nutritive media, and crystals showed less damage Based on the results of humidity measurements, it seems probable that the survivors suffered practically no water loss in such layers, in view of the fact that the radiation sensitivity and the duration of the lag phase remained practically unchanged as compared to the control group B H

A69-18970

DISASTER IN THE APOLLO SPACECRAFT CABIN AND MEASURES OF INCREASING FIRE AND EXPLOSION SAFETY DURING SPACE FLIGHTS [O KATASTROFE V KABINE KOSMICHESKOGO KORABLIA "APOLLON" I MERAKH, POVYSHAUSHCHIKH POZHARO- I VZRYVOBEZOPASNOST' KOSMICHESKIKH POLETOV].

I. M. Abduragimov and S. A. Iantovskii

Kosmicheskaya Biologiya i Meditsina, vol. 2, Nov.-Dec. 1968, p. 3-9. 12 refs. In Russian.

Review of the results of an investigation of the causes of the fire in the Apollo spacecraft, as released by a special inquiry board, which resulted in an immediate ban on 100% oxygen atmospheres in testing facilities Revised recommendations concerning the power supply, the cabin atmosphere, and safety measures in emergency situations are presented V P

A69-18971

PHYSICO-CHEMICAL SYNTHESIS OF MONOSACCHARIDES FROM HUMAN WASTE PRODUCTS [FIZIKO-KHIMICHESKII SINTEZ MONOSAKHARIDOV IZ PRODUKTOV ZHIZNEDEIATEL'NOSTI CHELOVEKA]

Iu. E. Simak.

Kosmicheskaya Biologiya i Meditsina, vol. 2, Nov.-Dec. 1968, p. 9-16. 28 refs. In Russian.

Discussion of physicochemical schemes for synthesizing carbohydrates and waste products at atmospheric and elevated pressures. The schemes examined include the phase of methane oxidation by nitrogen oxides and by ozone. Some results obtained by the methods described are analyzed. V P

A69-18972

COMBINED EFFECT OF COSMOS 110 SPACE FLIGHT FACTORS ON PLANTS [KOMBINIROVANNOE DEISTVIE FAKTOROV KOSMICHESKOGO POLETA SPUTNIKA ZEMLI "KOSMOS-110" NA RASTENIYA]

D. F. Gertsuskii, M. G. Petrovskii, and L. V. Alekseenko

Kosmicheskaya Biologiya i Meditsina, vol. 2, Nov.-Dec. 1968, p. 17-21. 24 refs. In Russian.

Discussion of the growth and development of plants grown from seeds after the latter were exposed to space flight factors on board the Cosmos 110 biological satellite It was found that these plants grew and developed faster and had a higher yield than the control plants on the ground. The plants contained greater amounts of ascorbic acid and a higher percentage of water than the control plants. The sugar content, however, was the same. The effects observed are attributed to the combined effect of all space factors rather than to the influence of ionizing radiation alone V P

A69-18973

DISTURBANCE OF THE CELL DIVISION PROCESS IN THE BONE MARROW OF RATS IRRADIATED BY 50-MEV PROTONS [NARUSHENIE PROTSESSOV KLETOCHNOGO DELENIA V KOSTNOM MOZGU KRYSA, OBLUCHENNYKH PROTONAMI 50 MEV]

R. D. Govorun

Kosmicheskaya Biologiya i Meditsina, vol. 2, Nov.-Dec. 1968, p. 21-25. 13 refs. In Russian.

Investigation of the influence of proton irradiation on the division and depletion of bone-marrow cells of rats. It is found that total irradiation by 50-MeV protons disrupts the mitotic activity and the division of bone-marrow cells and, in addition, introduces destructive changes in the latter A distinct suppression of the mitotic activity of bone-marrow cells and a decrease in the absolute number of divisible cells in the femur, observed a few hours after irradiation, are attributed not only to a disturbance of cell division due to blocking during certain periods of the mitotic cycle but also to the death of a large number of divisible cells due to structural changes of the cell nuclei V P

A69-18974

INFLUENCE OF "ARTIFICIAL MARS" CONDITIONS ON SOME ENZYMES [VLIYANIE USLOV'II "ISKUSSTVENNOGO MARSA" NA NEKOTORYE FERMENTY]

E. V. Belikova, G. S. Komolova, and I. A. Egorov.

Kosmicheskaya Biologiya i Meditsina, vol. 2, Nov.-Dec. 1968, p. 25-31. 17 refs. In Russian.

Investigation of the resistance of such biologically important enzymes as ribonuclease, α -amylase, and trypsin to a simulated Martian environment. The enzymes were found to exhibit a higher resistance than in the earth's atmosphere at 40°C The overall results indicate that the low Martian temperatures and the abrupt temperature fluctuations characteristic of the Martian environment have an inactivating effect on the enzymes V P

A69-18975

IMMUNOLOGICAL AND HISTOCHEMICAL CHARACTERISTIC OF THE REACTIVITY OF MICE PLACED IN A MEDIUM WITH A HIGH OXYGEN CONTENT [IMMUNOLOGICHESKAYA I GISTOKHIMICHESKAYA KHAARAKTERISTIKA REAKTIVNOSTI MYSHEI, NAKHODIVSHISYA V SREDE S POVYSHENNYM SODERZHANIEM KISLORODA]

A. S. Kaplanskii, F. V. Babchinskii, and G. N. Durnova

Kosmicheskaya Biologiya i Meditsina, vol. 2, Nov.-Dec. 1968, p. 31-35. 13 refs. In Russian.

Application of immunological histochemical techniques to the study of the reactivity of mice exposed for 20 days to an atmosphere with an oxygen partial pressure of 304 mm Hg It is found that increased oxygen content affects neither the antibody formation rate nor the resistance of immunized mice to *Salmonella typhimurium*, but tends to decrease the phagocytic activity of neutrophils and to increase that of macrophages Long-term exposure to hyperoxic atmospheres was found to lead to losses in the body weight and a decrease in the mass of lymph nodes, and to involve the development of irritations of the lymphoid tissue V P

A69-18976

INFLUENCE OF HIGH OXYGEN CONCENTRATION ON THE CONDITIONED REFLEX ACTIVITY AND BIOLOGICAL ACTIVITY OF CERTAIN CORTICAL AREAS AND SUBCORTICAL FORMATIONS OF RABBITS [VLIYANIE VYSOKIKH KONTSENTRATSII KISLORODA NA USLOVNOREFLEKTORNUIU DEIATEL'NOST' I BIOELEKTRICHESKUIU AKTIVNOST' NEKOTORYKH OBLASTEI KORY I PODKORKOVYKH OBRAZOVANII KROLIKOV]

N. A. Agadzhaman, I. N. Zakharova, and L. V. Kaluzhnyi

Kosmicheskaya Biologiya i Meditsina, vol. 2, Nov.-Dec. 1968, p. 35-42. 27 refs. In Russian.

Investigation of Voronin's (1957) conditioned alimentary response (reflex) to light flashes (0.45 J at a frequency of 5 flashes/

sec) of rabbits kept in a hermetically sealed chamber with an oxygen content of 96% at 26°C and normal pressure for 72 to 80 hr. It was found that under the effect of high oxygen concentrations, the disturbance of conditioned reflex activity and the associated EEG activity occurs according to a well defined sequential order. A weakening of the nonconditioned and conditioned components of the alimentary reflex is followed by a phase that is characterized by a disappearance of the conditioned alimentary reflex activity. However, the EEG arousal reaction is still present. The last phase is characterized by the absence of both conditioned alimentary reflex activity and the EEG arousal reaction. V P

A69-18977

INFLUENCE OF DIETS CONTAINING UNICELLULAR ALGAE ON THE RECOVERY OF METABOLIC PROCESSES IN PROTEIN-DEFICIENT WHITE RATS [VLIANIE RATSIONA S ODNOKLETOCHNYMI VODOROSLIAMI NA VOSTANOVLENIE OBMENNYKH PROTSESSOV U BELYKH KRY S POSLE BELKOVOGO GOLODANIYA] N S Kliushkina, V I Fofanov, I. T. Troitskaia, and T A Smirnova

Kosmicheskaya Biologiya i Meditsina, vol 2, Nov.-Dec. 1968, p 42-47 8 refs. In Russian.

Investigation of the effect of diets containing a bleached biomass of unicellular algae as the sole protein source on the recovery of metabolic processes in white rats previously kept on protein-deficient diets. It was found that the algae diets helped to recover the metabolic processes to the same extent as casein-containing diets, in control tests, and that they were more effective than diets containing soya protein. V P

A69-18978

THEORETICAL ASPECTS OF THE SELECTION OF THE PHYSIOLOGICAL PARAMETER COMPLEX FOR MEDICAL CONTROL DURING SPACE FLIGHTS [TEORETICHESKIE ASPEKTY VYBORA KOMPLEKSA FIZIOLOGICHESKIKH PARAMETROV DLYA MEDITSINSKOGO KONTROLIA V KOSMICHESKIKH POLETAKH]. Iu G Nefedov, A. D. Egorov, and L I Kakurin.

Kosmicheskaya Biologiya i Meditsina, vol 2, Nov.-Dec. 1968, p. 47-55. 35 refs. In Russian.

Discussion of some aspects of the scientific approach to the selection of the optimum physiological parameters for the medical control of crew members during space flights. Criteria for determining the most informative parameters are proposed and analyzed. Methods for evaluating physiological information, including Fisher's (1958) statistical method of analysis, which makes it possible to assess the influence of qualitative and quantitative space flight factors on the human organism, are discussed. V P.

A69-18979

COORDINATION STRUCTURE OF ARBITRARY HUMAN MOTIONS OF VARIOUS COMPLEXITY DURING FLIGHT ALONG A KEPLER PARABOLA [KOORDINATSIONNAYA STRUKTURA PROIZVOL'NYKH DVIZHENII CHELOVEKA RAZLICHNOI SLOZHNOSTI V USLOVIYAKH POLETA PO PARABOLE KEPLERA]. I. F. Chekirda.

Kosmicheskaya Biologiya i Meditsina, vol. 2, Nov.-Dec 1968, p 55-62 12 refs. In Russian.

Determination of certain phases in the reorganization of the coordination structure of purposeful human motions (such as use of a hammer) during short-term weightlessness. The results are used to perform a cyclographic analysis of the time required to adjust motions of various complexity to a zero-g environment. In terms of Bernstein's (1947) theory of motion levels based on a sequential phylogenetic development of the various parts of the central nervous system, the results obtained indicate that adaptation occurs first for motions of the synergy level, followed by motions of the spatial field level, and lastly for motions of the "object action" level. V P

A69-18980

INFLUENCE OF AGE, PROFESSION, AND PHYSICAL TRAINING ON THE TOLERANCE OF MAN TO PROLONGED ACCELERATIONS [VLIANIE VOZRASTA, PROFESSII I FIZICHESKOI PODGOTOVKI NA PERENOSIMOST' CHELOVEKOM DLITEL'NYKH USKORENIY] P M Suvorov

Kosmicheskaya Biologiya i Meditsina, vol 2, Nov.-Dec 1968, p 62-66 28 refs. In Russian.

Investigation of the reactions to repeated 30-sec centrifugal accelerations of 3 to 7 g in a group of 127 pilots with symptoms of vascular-vegetative instability and a group of 300 healthy subjects, 20 to 49 years old, having different physical training backgrounds and occupations (including fighter pilots, engineers, physicians, scientists, athletes, and acrobats). The acceleration tolerance was lowest in the 20 to 24-year age bracket and highest in the 30 to 34-year age bracket, and was higher in athletes, weight lifters, and acrobats than in long-distance runners, skiers, and soccer players, or in subjects without a regular physical training background. V Z

A69-18981

TIME PERCEPTION UNDER CONDITIONS OF BRIEF WEIGHTLESSNESS [O VOSPRIYATII VREMENI V USLOVIYAKH KRATKOVREMENNOI NEVESOMOSTI]

V I. Lebedev, I F Chekirda, and I. A. Kolosov

Kosmicheskaya Biologiya i Meditsina, vol 2, Nov.-Dec 1968, p 67-71 5 refs. In Russian.

Investigation of the time perception capacity in a group of 30 astronauts and jet pilots under conditions of brief weightlessness during climbing and diving periods of jet flights. The subjects were required to estimate the duration of weightlessness, or to determine a 20-sec time interval, while performing various physical assignments, such as writing, handling of instruments and movements. The effects of the emotional state of the subject on his time perception capacity are indicated. Comments made by cosmonaut Gagarin on his time perception are mentioned. V Z.

A69-18982

ACCELERATION TOLERANCE OF MAN UNDER LOW BAROMETRIC PRESSURE [PERENOSIMOST' CHELOVEKOM USKORENIY PRI PONIZHENNOM BAROMETRICHEKOM DAVLENIY]

A S Barer, G A Golov, V B Zubavin, and E P Tikhomirov

Kosmicheskaya Biologiya i Meditsina, vol 2, Nov.-Dec 1968, p 71-76 13 refs. In Russian.

Pressure-chamber investigation of the effects of spine-to-chest accelerations up to 12 g on the tolerance of a group of men subjected to reduced pressures corresponding to altitudes of up to 10,000 km. Disorders of vision are indicated as the most frequent effect of accelerations at pressures corresponding to altitudes of 5000 m or more. On the other hand, no signs of heart-beat decompression disorders were established over the entire range of altitudes investigated. V Z

A69-18983

CERTAIN INDICES OF THE STATE OF THE CARDIOVASCULAR SYSTEM IN PRACTICALLY HEALTHY MEN [NEKOTORYE POKAZATELI SOSTOYANIYA SERDECHNO-SOSUDISTOI SISTEMY U PRAKTICHESKI ZDOROVYKH LIUDEY]

M L Kolomevskii

Kosmicheskaya Biologiya i Meditsina, vol 2, Nov.-Dec 1968, p 77-81 9 refs. In Russian.

Demonstration of the importance of a thorough medical examination of the cardiovascular system in the selection of aircraft and spacecraft crew members from the so-called practically healthy candidates with no apparent disorders or complaints. The results of a medical examination of a group of such candidates are reviewed, and examples are given in support of the importance of such examinations. V Z

A69-18984 #

CHANGES IN THE PROCESS OF MYOCARDIAL REPOLARIZATION IN HEALTHY PERSONS WITH RESTRICTED MOTOR ACTIVITY [IZMENENIYA PROTSESSA REPOLIARIZATSII MIOKARDA U ZDOROVYKH LITS PRI OGRANICHENII DVIGATEL'NOI AKTIVNOSTI] B A Korolev

Kosmicheskaya Biologiya i Meditsina, vol 2, Nov -Dec 1968, p 81-86 11 refs In Russian

Discussion of the process of myocardial repolarization in subjects exposed to long-term hypodynamics. A repolarization disturbance is indicated by the development of the $T_{V_1} > T_{V_6}$ syndrome and the appearance or increase in the amplitude of the U spike. Other indications are changes in the ratio of U and T amplitudes, the length of the aT-aU and S-aU segments, and the RR/S-aU ratio. Standard values for these parameters for healthy people have been established by Nikitin (1963). With the aid of the hypoxic test the repolarization process was studied in 16 healthy male test subjects exposed to long-term hypodynamics. This condition occurred during space missions and in special experiments. It caused shifts of the myocardial repolarization, thus giving evidence for changes in the myocardial metabolism. G R

A69-19133

TRANSMISSION OF CARDIOVASCULAR DATA FROM DOGS

R. Rader, J P Meehan, J P Henry, R Krutz, and R Trumbo (Southern California, University, Dept of Physiology, Los Angeles, Calif)

IN INTERNATIONAL TELEMETERING CONFERENCE, LOS ANGELES, CALIF , OCTOBER 8-11, 1968, PROCEEDINGS [A69-19092 07-07]

Conference sponsored by the International Foundation for Telemetering

Tarzana, Calif , International Foundation for Telemetering (ITC Proceedings Volume 4), 1968, p 597-606. 6 refs. Contract No AF 41(609)-3039

Consideration of the prolonged acquisition of dynamic blood pressure data from animal subjects in various experimental conditions. In order to properly conduct many of these experiments, the subject must be instrumented with blood-pressure sensors and a means of conveying the indicated pressure level to a remote station. Quite often data must be obtained over several weeks in which recalibration cannot be conducted. Telemetry techniques are quite adaptable to these problems, and in many instances are the only solution available. Several experiments are described to illustrate the special applications of telemetry, as well as the hardware required to conduct these experiments. F R L

A69-19136 *

TELEMETRY WITH UNRESTRAINED ANIMALS

Howard A Baldwin and Donald L. Brumbaugh (Sensory Systems Laboratory, Tucson, Ariz)

IN INTERNATIONAL TELEMETERING CONFERENCE, LOS ANGELES, CALIF , OCTOBER 8-11, 1968, PROCEEDINGS [A69-19092 07-07]

Conference sponsored by the International Foundation for Telemetering

Tarzana, Calif , International Foundation for Telemetering (ITC Proceedings Volume 4), 1968, p. 639-649 8 refs. Contract No Nonr-4315(00), Grants No AF AFOSR 1175-67, No. NGR-03-041-001.

Discussion of telemetry from animals in their natural environments, using simple but efficient data coding methods. Radio tracking experiences with various game animals (zebras, lions, buffalo, elephants, hyenas) are summarized, and an outline of instrumentation requirements for a study of long-range goal-finding ability in the green sea turtle is presented. F R L

A69-19171

HAZARDOUS EXPOSURE TO IMPULSE NOISE

R Ross A Coles (Royal Naval Medical School, Alverstoke, Hants , Southampton, University, Institute of Sound and Vibration Research, Southampton, England), Georges R Garinther, David C Hodge (U S Army, Human Engineering Laboratories, Aberdeen

Proving Ground, Md), and Christopher G Rice (Southampton, University, Institute of Sound and Vibration Research, Southampton, England).

Acoustical Society of America, Journal, vol 43, Feb 1968, p. 336-343 56 refs

Research sponsored by the British Medical Research Council and the U S Army

The paper presents impulse-noise damage-risk criteria based on conclusions of independent British and American studies and on the work of other research workers in this field. Most of the studies were performed with noise from small arms, but the criteria are general enough to permit assessment of most other types of impulse noise. The variables that must be considered in determining the potential hearing hazard and in the practical application of the criteria are presented, and the parameters that must be measured are defined. The measurement technique and type of transducers to be used are discussed. (Author)

A69-19260 *

ENZYMATIC SYNTHESIS OF ADRENALINE IN MAMMALIAN BRAIN

Roland D Ciaranello, Rebecca E Barchas, Gregory S Byers, Donald W Stemmler, and Jack D Barchas (Stanford University, School of Medicine, Dept of Psychiatry, Stanford, Calif)

Nature, vol 221, Jan 25, 1969, p 368, 369 13 refs. PHS-Navy-NASA-supported research

Results of the investigation of endogenous concentrations of adrenaline in the brain when it is given intraventricularly or intravenously. Brain areas from adult Simonson rats were used to study the uptake, metabolism, and synthesis of adrenaline by the mammalian brain. It had generally been assumed that the major effect of adrenaline on behavior was due to adrenaline from the adrenal gland entering the circulation. The study shows that the mammalian brain itself synthesizes adrenaline and suggests that it may act on the central nervous system not only as a peripheral hormone, but also as a neuroregulatory agent or a neurotransmitter. B H

A69-19263

MICROTUBULES IN SPERMATOCYTES OF CHILIDIA (TURBELLARIA, ACOELA) REVEALED BY NEGATIVE STAINING

Donald P Costello, Catherine Henley, and Charles R. Ault (North Carolina, University, Dept of Zoology, Chapel Hill, N C)

Science, vol 163, Feb 14, 1969, p. 678, 679 21 refs. PHS Grant No GM-15311

Many intact axial units, with attached basal plates, are found in spermatocytes of Chilidia groenlandica negatively stained with phosphotungstic acid. Electron micrographs show a total of nine doublet microtubules, confirming observations on sectioned material where nine peripheral doublets, but no single central ones, occurred. Living spermatocytes move by waves progressing along a double undulating membrane. (Author)

A69-19420 #

STUDY OF MAN DURING A 56-DAY EXPOSURE TO AN OXYGEN-HELIUM ATMOSPHERE AT 258 MM Hg TOTAL PRESSURE

XIV - COMMUNICATIONS

Charles W Nixon (USAF, Aerospace Medical Div , Aerospace Medical Research Laboratories, Biological Acoustics Branch, Wright-Patterson AFB, Ohio), William E Mabson, B E Welch (USAF, Aerospace Medical Div , School of Aerospace Medicine, Environmental Systems Branch, Brooks AFB, Tex), and Frank Trimboli (Dayton, University, Research Institute, Dayton, Ohio) *Aerospace Medicine*, vol 40, Feb 1969, p 113-123 13 refs

During a simulated space mission, speech was analyzed to investigate the effects on communication of a 56-day exposure to a cabin atmosphere composed of 30% helium and 70% oxygen at an altitude of 27,000 ft. Word intelligibility was satisfactory so long as the level of ambient noise in the speech frequency range did not exceed the speech level. Fundamental frequency remained relatively

unaffected by the gas mixture. Mean second and third formant frequencies were 1.109 and 1.079 times higher in the helium exposure than in the initial ground level air condition. There was no adaptation as a function of time in the helium mixture, however, some persistence effects in formant frequency shift were seen during the postexposure condition. Calculated velocity of sound ratios were found to overestimate the measured amount of formant shift by a means factor of 0.05 for the 30% helium mixture. Speech quality was judged to deteriorate with increased duration of exposure to the 30% helium mixture. (Author)

A69-19421

EFFECT OF STARTLE STIMULI ON PERFORMANCE

M Vlasak (Institute of Aviation Medicine, Dept of Flight Safety, Prague, Czechoslovakia)

Aerospace Medicine, vol 40, Feb 1969, p 124-128. 8 refs

The effect of auditory startle stimulus on the performance of 178 healthy men in various tasks has been studied. The tasks consisted of mental activity, complex psychomotor activity, simple sensorimotor activity, equilibrium in standing position on one leg, simple visual reaction time, and muscular force of a fatigued muscle. The strong sound of the klaxon-hoot or the sound of the pistol-shot were used as startle stimuli. Performance decreased in all tasks except the force of fatigued muscle, which showed improvement for a period of about 10 sec. The quantity and quality of the efficiency in mental and complex sensorimotor activity decreased very substantially for 20-30 sec on the average. (Author)

A69-19422 *

RELATIONSHIP BETWEEN TOCOPHEROL STATUS AND IN VIVO HEMOLYSIS CAUSED BY HYPEROXIA

Charles E. Mengel (Ohio State University, College of Medicine, Div of Hematology and Oncology, Columbus, Ohio), J. Richard Goldstein, Robert L. Carolla, and Larry Ebbert

Aerospace Medicine, vol 40, Feb 1969, p 132-135. 13 refs
PHS Grant No. CA-08702-02, Contracts No. Nonr-495(30), No. AF 33(615)-67-C-1482, No. NAS 9-6910

Study to determine the sequence of events in the development of hemolytic susceptibility to hyperoxia in mice deficient in tocopherol. Mice of both sexes were started on a tocopherol-deficient test diet and compared at weekly intervals to control mice with respect to weight, standard hematologic indices, plasma tocopherol levels, red blood cell catalase activity, red cell lipid composition, and in vivo hemolytic susceptibility to oxygen under high pressure. Tocopherol-deficient mice developed increased lytic sensitivity of red cells to H_2O_2 after one week, a significant fall of plasma tocopherol after two weeks, and in vivo hemolysis by hyperoxia after four weeks. G. R.

A69-19423 *

OXYGEN RECLAMATION FROM CARBON DIOXIDE USING A SOLID OXIDE ELECTROLYTE

Joseph Weissbart, Wilson Smart (Applied Electrochemistry, Inc., Mountain View, Calif.), and Theodore Wydeven (NASA, Ames Research Center, Moffett Field, Calif.)

Aerospace Medicine, vol 40, Feb 1969, p 136-140

Oxygen recovery from carbon dioxide was accomplished by electrolyzing carbon dioxide using a solid oxide electrolyte of the composition $(ZrO_2)_0.85 (CaO)_0.15$. It was found possible to obtain 100% Faradaic efficiency for oxygen at less than $1000^\circ C$ by introducing a small amount of water vapor into the carbon dioxide feed gas. A $1-A CO_2$ electrolyzer that utilized porous platinum electrodes, noble metal seals, and electrolytes in a disk configuration was run continuously for 2016 hr near $850^\circ C$ and a current density of $100 mA/cm^2$. The Faradaic efficiency for oxygen remained near 100% throughout the extended test. The following conservative design parameters for a one-man prototype CO_2 electrolyzer for O_2 recovery seem reasonable at the present time: operating temperature, $850^\circ C$,

current density, $100 mA/cm^2$, current efficiency for O_2 , 100%, electrolysis power, 250W, and electrolysis power efficiency, 50%. (Author)

A69-19424

MEASUREMENT OF SYMPATHETIC NEUROHORMONES IN THE PLASMA OF RACE CAR DRIVERS

Jacqueline L. Claus Walker, V. P. Collins, and W. G. McTaggart (Baylor University, College of Medicine, Dept of Rehabilitation and Radiology, Texas Institute for Rehabilitation and Research, Houston, Tex.)

Aerospace Medicine, vol 40, Feb 1969, p 140, 141. 15 refs
General Research Support Grant No. P 67-17, PHS Grant No. FR-00129

In an attempt to correlate the physiologic indices of stress observed during the race in trained race car drivers, plasma epinephrine (E) and norepinephrine (NE) were evaluated in 13 subjects. The blood was withdrawn at the onset of the race and 5 to 10 min after completion. The effects of the stress upon activation of the sympathetic nervous system were not observed by measurement of catecholamines in blood taken at the onset and the completion of the stress. This is believed to be due to the transient nature of the sympathetic activation. (Author)

A69-19425 *

PREVENTION OF OVERT MOTION SICKNESS BY INCREMENTAL EXPOSURE TO OTHERWISE HIGHLY STRESSFUL CORIOLIS ACCELERATIONS

Ashton Graybiel, F. Robert Deane, and James K. Colehour (U.S. Naval Aviation Medical Center, Aerospace Medical Institute, Pensacola, Fla.)

Aerospace Medicine, vol 40, Feb 1969, p 142-148. 18 refs
NASA-sponsored research

Discussion of an experiment in which overt symptoms of motion sickness at 10 rpm were prevented solely by means of incremental increases to terminal velocity. This demonstrated that the adaptive processes somehow inhibited the irradiation of vestibular activity to cell assemblies in cerebellar, hypothalamic, and other areas concerned in the genesis of symptoms and that "habituation of symptoms" was not essential in their prevention. By ensuring the subject's stability, these processes may properly be regarded as homeostatic in nature, preserving a homeostatic state. This implies that slow rotation room sickness may be defined as a failure in homeostatic processes caused by too sudden an exposure to strong Coriolis acceleration. G. R.

A69-19426

NEUROPATHOLOGICAL CORRELATES OF NEUROLOGICAL IMPAIRMENT FOLLOWING PROLONGED DECOMPRESSION

J. B. Brierley (Medical Research Council, Neuropsychiatric Research Unit, Carshalton, Surrey, England) and A. N. Nicholson (Royal Air Force, Institute of Aviation Medicine, Farnborough, Hants., England)

Aerospace Medicine, vol. 40, Feb 1969, p 148-152. 14 refs

Results of a neuropathological examination of four baboons which had been exposed to prolonged decompression simulating the effect of small structural failures in the cabin of a hypothetical aircraft operating at 60,000 ft. Three decompressions of triangular profile were studied, each of approximately fourteen minutes duration, with peak altitudes of 30,000 ft, 42,500 ft and 53,000 ft. The decompression corresponding to a peak altitude of 42,500 ft was compatible with immediate survival although neurological impairment was present in two animals. Neuropathological examination of these animals has revealed extensive neocortical damage centered upon the boundary zones between the territories supplied by the major cerebral arteries. G. R.

A69-19427

A69-19427

MANNED TEST OF A REGENERATIVE LIFE SUPPORT SYSTEM
T M Olcott, W J Conner, and W M Helvey (Lockheed Aircraft Corp., Lockheed Missiles and Space Co., Biotechnology Section, Sunnyvale, Calif.)

Aerospace Medicine, vol 40, Feb 1969, p 153-160 5 refs

Four test subjects were confined in a 10³ ft entry-lock to a large man-rated altitude chamber. This entry-lock was configured to represent a lunar shelter with sleeping, eating, and waste management accommodations. The atmosphere was maintained at 42% oxygen, 58% nitrogen, and an altitude equivalent of 18,000 ft. The regenerative life support system removed carbon dioxide, perspired and respired water, and trace contaminants from the atmosphere, and added oxygen on demand to maintain the desired oxygen partial pressure. The carbon dioxide was subsequently hydrogen reduced in a Sabatier reactor to water and methane. The methane product was discarded and the water was electrolyzed into hydrogen and oxygen. The hydrogen was returned to the Sabatier reactor to react with the carbon dioxide, while the oxygen was stored to be injected, as required, into the test chamber. Water was also reclaimed from urine in a vacuum distillation unit integral with the regenerative system. Data are presented on overall performance, as well as on the characteristics of each subsystem. (Author)

A69-19428

NOMOGRAM FOR ESTIMATING BODY FAT, SPECIFIC GRAVITY AND LEAN BODY WEIGHT FROM HEIGHT AND WEIGHT
William R Pierson and E L Eagle (Lockheed Aircraft Corp., Lockheed-California Co., Human Engineering Dept., Burbank, Calif.)

Aerospace Medicine, vol 40, Feb 1969, p 161-164 22 refs

Discussion of a nomogram which provides the aviation flight surgeon and the practicing physician with an office tool for the estimation of body fat and specific gravity. A two-component model of body composition and lean body weight is assumed. The method is reliable and objective, and comparisons with other more costly and time-consuming methods indicate no appreciable differences in the results obtained. The use of the nomogram should be restricted to male subjects within the "normal" range of height and weight.

G R

A69-19429 *

IN VIVO UTILIZATION OF ACETATE-1-C¹⁴ IN CENTRIFUGED RATS

E D Neville and D D Feller (NASA, Ames Research Center, Environmental Biology Div., Moffett Field, Calif.)

Aerospace Medicine, vol 40, Feb 1969, p 164-167 13 refs

Fed and fasted male rats were centrifuged at 5 g for 1, 3, and 24 hr. After this exposure, the metabolism of the rat was followed for a 3-hr period by measuring plasma glucose, plasma FFA, expired C¹⁴O₂ and CO₂ patterns, and recovery of C¹⁴ in plasma lipids from acetate-1-C¹⁴. Centrifugation caused a significant rise in plasma glucose and FFA in both fasted and fed rats. Plasma glucose remained elevated during the 3-hr postcentrifugation period while plasma FFA returned to normal values. Lipid synthesis increased in the intact rat as measured by an increased plasma C¹⁴-lipid content. The observed increase of acetate incorporation into plasma lipids of rats previously exposed to centrifugation stress supports the previous observation, on isolated tissues, that this stress enhances lipogenesis. The relative roles of plasma glucose and FFA in energy relations of stressed animals are discussed. (Author)

A69-19430

HYPOXIA WARNING - A NEW TECHNIQUE

A T Kissen (USAF, Systems Command, Aerospace Medical Div., Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio), D W McGuire (Brun Sensor Systems, Columbus, Ohio), and W J Hovey (Dayton, University, Research Institute, Dayton, Ohio)

Aerospace Medicine, vol 40, Feb 1969, p 168-173 5 refs.

Contract No AF 33(615)-68-C-1167

A technique providing accurate, reliable, and operationally realistic hypoxia warning is evaluated. It incorporates a dry electrolyte oxygen sensor with millisecond response time and an alarm circuit designed to recognize and count breaths exhibiting maximal pO₂ values below an electronically present pO₂ warning level. Thirteen men, breathing ambient altitude chamber atmosphere "rode" from ground level to 9500 ft and return (1500 ft/min), simulating operational malfunction in oxygen delivery. The system continuously sampled gas mixtures within the mask. The system was preset to initiate a hypoxia warning alarm at 118 mm Hg pO₂. For all subjects, the mean value for alarm trigger (78 observations) was 118.61 mm. For resetting the alarm to its "safe" status (77 observations), the mean value was 120.78 mm Hg pO₂. (Author)

A69-19431

SPATIAL DISORIENTATION AS A FACTOR IN ACCIDENTS IN AN OPERATIONAL COMMAND

Royce Moser, Jr (USAF, Aerospace Defense Command, Office of the Command Surgeon, Ent AFB, Colo.)

Aerospace Medicine, vol 40, Feb 1969, p 174-176 7 refs

The aircraft accident history in the Aerospace Defense Command was reviewed for the four-year period 1964-1967. Spatial disorientation was considered to be a significant factor in approximately 9% of the major flight accidents and 26% of the fatal accidents. The finding that the pilots involved in 91% of the spatial disorientation accidents had accumulated over 1000 hr total flying time emphasizes the need to direct training efforts at the experienced pilot as well as the relatively inexperienced pilot. (Author)

A69-19432 *

RESISTANCE TO EXPERIMENTAL BACTERIAL PNEUMONIA AND INFLUENZA INFECTION IN SPACE CABIN ENVIRONMENT
Richard Ehrlich and Bernard J Mieszkuc (IIT Research Institute, Chicago, Ill.)

(International Congress on Aviation and Medicine, 17th, Oslo, Norway, Aug 5-8, 1968)

Aerospace Medicine, vol 40, Feb 1969, p 176-179 12 refs
Contracts No. NAS 9-4978, No NAS 9-7180

Resistance to infections initiated by a respiratory challenge with *Klebsiella pneumoniae* or influenza virus appeared to be reduced in mice exposed to a simulated space cabin environment consisting of 5 psi and 100% oxygen atmosphere. The reduced resistance, manifested by enhanced mortality was observed in mice challenged with the infectious agents 1 hr to 7 days before entry into the space cabin environment. Increased mortality rates were also obtained as the result of infectious challenge during exposure to the space cabin environment. However, an adaptation to this stress, in terms of susceptibility to influenza virus, appeared to be present upon 36 day exposure to the 5 psi environment. The time at ground level conditions required for the recovery from the stress of the space cabin environment was related to the duration of the exposure and the infectious agent used for the challenge. (Author)

A69-19433

MEDICAL FACTORS IN U S GENERAL AVIATION ACCIDENTS
P V Siegel (Federal Aviation Administration, Washington, D.C.) and S R Mohler (Federal Aviation Administration, Office of Aviation Medicine, Aeromedical Applications Div., Washington, D.C.)

Aerospace Medicine, vol 40, Feb 1969, p 180-184 5 refs

Discussion of the part medical factors affecting the pilot play in aviation accidents. Investigations of the probable cause of aircraft accidents have revealed that many accidents result from circumstances having a medical basis. Thus, psychological factors can induce pilots to take unnecessary risks. The majority of general-aviation weather accidents occur after the pilot had ample warning that a critical circumstance was developing. Other factors causing accidents include carbon monoxide poisoning, hypoxia, alcohol, appendicitis, cardiovascular disease, and suicides. G R.

A69-19434**PSYCHOPATHOLOGY OF AIRLINE STEWARDESSES**

C J Blanc, R Digo, and P Moroni (Compagnie Nationale Air France, Medical Dept, Paris, France)

Aerospace Medicine, vol 40, Feb. 1969, p 184-187.

Discussion of psychological or psychiatric studies of stewardesses of a French airline. One hundred fifty-one stewardesses were examined in connection with depressive, neurotic, or psychosomatic episodes. The conditions most widely represented were neurotic depressive reactions (35%) and acute neurotic syndromes of H structure (40%). Among the inductive elements there are to be found, in more than 60% of the cases, conflicting factors of a private nature with no direct relation to professional activity and mostly focused on the vicissitudes of love life and sex life. The genesis of symptoms and psychopathological structures corresponds to complex etiological sequences with phenomena of over-determination. G R

A69-19435**DRUG AND TOXIC HAZARDS IN GENERAL AVIATION.**

J. Robert Dille (Federal Aviation Administration, Civil Aeromedical Institute, Oklahoma City, Okla.) and Stanley R Mohler (Federal Aviation Administration, Aeromedical Applications Div., Washington, D.C.).

(Texas Medical Association, Meeting, Houston, Tex., May 2, 1968.)

Aerospace Medicine, vol. 40, Feb. 1969, p. 191-195. 6 refs.

Discussion of both the potential and the documented roles of drugs, alcohol, pesticides, and carbon monoxide in general aviation accidents. The drugs discussed include analgesics, antihistamines, nasal decongestants, motion sickness medications, amphetamines, tranquilizers and sedatives, cardiac agents, muscle relaxants, steroids, drugs for hyperuricemia, anticholinergics, and "the pill." With regard to alcohol, further research is indicated to better identify the legal level of intoxication with flying. G R

A69-19436**PROTECTION OF PILOTS AGAINST LASERS**

Leon Goldman, R James Rockwell, Jr., Robert Epstein, R E Kinneman, Edward Schechter, and Robert Meyer (Cincinnati, University, College of Medicine, Cincinnati, Ohio, U.S. Marine Corps, Cherry Point, N C)

Aerospace Medicine, vol 40, Feb 1969, p 196, 197

Research supported by the John H Hartford Foundation, PHS Grant No UI-00413.

Discussion of the hazards to pilots arising from lasers, and examination of protection measures against them. Presently available laser systems provide extremely hazardous high-intensity output parameters. Such lasers are being considered for use as laser radar, tracking devices, image intensifiers, night-vision illuminators and, conceivably, for weaponry against aircraft personnel. The present system of actual eye protection is with the use of laser protective glasses. The other phase of the pilot safety program relates to area protection. To warn the pilot about laser radiation, special detection systems must be installed. G R

A69-19480 ***A SAMPLED-DATA REGULATOR FOR MAINTAINING A CONSTANT ALVEOLAR CO₂.**

Garland H. Holloman, Jr., Howard T. Milhorn, Jr., and Thomas G. Coleman (Mississippi, University, Medical Center, Dept of Physiology and Biophysics, Jackson, Miss.).

Journal of Applied Physiology, vol 25, Oct 1968, p. 463-468. 13 refs.

NIH Grant No HE-09737, Grant No. NGR-25-002-015.

A sampled-data regulator for maintaining a constant alveolar CO₂ during the ventilatory transients evoked by hypoxic stimulation is presented. Since the most accessible indication of alveolar CO₂ is the end-tidal sample, the assumption is made that in normal young subjects end-tidal CO₂ is a satisfactory measurement of alveolar CO₂. This regulator provides a method of investigating both steady-

state and transient responses of the respiratory system to reduced O₂ at various fixed levels of CO₂. Data from a typical subject are shown for a step change from room air to a 9% O₂ mixture, with unregulated alveolar CO₂ and with the CO₂ maintained at the subject's normal resting value. Other possible uses of this type of system are discussed. (Author)

A69-19481 ***STUDIES OF THE ELECTRON TRANSPORT CHAIN OF EXTREMELY HALOPHILIC BACTERIA. I - SPECTROPHOTOMETRIC IDENTIFICATION OF THE CYTOCHROMES OF HALOBACTERIUM CUTIRUBRUM.**

J. K. Lanyi (NASA, Ames Research Center, Exobiology Div., Moffett Field, Calif.).

Archives of Biochemistry and Biophysics, vol 128, Dec. 1968, p. 716-724. 11 refs.

Room temperature and liquid nitrogen difference spectra of H cutirubrum extracts show evidence of two b-type, two c-type, and one a-type cytochrome. A scheme for electron transport involving these components is suggested whereby, at pH 7.2, the electron flow proceeds through cytochrome b(559), cytochrome c(555), and cytochrome a(592). At pH 9.4, however, it appears that an alternate pathway through cytochrome b(563) and cytochrome c(550) is opened. DPNH and α -glycerophosphate reduce both b-type cytochromes, while succinate reduces only cytochrome b(559). After overnight incubation, cytochrome b(563) is inactivated and can no longer be reduced enzymically. (Author)

A69-19482 ***A THEORETICAL STUDY OF PULMONARY CAPILLARY GAS EXCHANGE AND VENOUS ADMIXTURE**

Howard T. Milhorn, Jr and Paul E. Pulley, Jr (Mississippi, University, School of Medicine, Dept of Physiology and Biophysics, Biomedical Engineering Section and Computer Center, Jackson, Miss.)

Biophysical Journal, vol 8, no 3, 1968, p 337-357. 16 refs. Grant No. NGR-25-002-015

A model of pulmonary capillary gas exchange and venous admixture is presented, and the inclusion of this model into a model of the entire respiratory system is discussed. Partial pressure and concentration gradients for nitrogen, helium, oxygen, and carbon dioxide are predicted. The cases of breathing room air and 10% oxygen are studied. In both of these studies, the Bohr and Haldane effects are included, and the "physiological" dissociation curves of oxygen and carbon dioxide are predicted for the normal case as blood flows from the venous blood end of the capillary to the arterial blood end. Venous admixture effects are also calculated for both of these cases. The effects of emphysema, pulmonary congestion, and altered cardiac function on the gradients are studied. (Author)

A69-19490 ***CALCULATED ENERGY DEPOSITS FROM THE DECAY OF TRITIUM AND OTHER RADIOISOTOPES INCORPORATED INTO BACTERIA**

Richard Bockrath, Stanley Person, and Fred Funk (Pennsylvania State University, Biophysics Dept., University Park, Pa.)

Biophysical Journal, vol. 8, no. 9, 1968, p 1027-1036. 20 refs. Grants No. NSG-324, No. NGR-39-008-008.

Transmutation of the radioisotope tritium occurs with the production of a low energy electron, having a range in biological material similar to the dimensions of a bacterium. A computer program was written to determine the radiation dose distributions which may be expected within a bacterium as a result of tritium decay, when the isotope has been incorporated into specific regions of the bacterium. A nonspherical model bacterium was used, represented by a cylinder with hemispherical ends. The energy distributions resulting from a wide variety of simulated labeled regions were determined, the results suggested that the nuclear region of a bacterium receives on the average significantly different per decay doses, if the labeled regions were those conceivably produced by

A69-19491

the incorporation of thymidine-³H, uracil-³H, or ³H-amino acids. Energy distributions in the model bacterium were also calculated for the decay of incorporated ¹⁴C, ³⁵S, and ³²P (Author)

A69-19491 *

THE MECHANISM OF INACTIVATION OF T4 BACTERIOPHAGE BY TRITIUM DECAY

Stanley Person (Pennsylvania State University, Biophysics Dept., University Park, Pa.), Fred Funk, and Richard C. Bockrath, Jr. Biophysical Journal, vol. 8, no. 9, 1968, p. 1037-1050. 25 refs. NSF Grant No. GB-4485, Grants No. NSG-324, No. NGR-39-009-008.

Coliphage T4 was used as a model system to study the mechanism of biological inactivation produced by tritium decay. Experimentally, tritiated precursors were incorporated into phage DNA (thymidine-³H) or into phage protein (³H-amino acids). The ratio of killing efficiencies for decays originating in phage DNA to those originating in phage protein was 2.6. Inactivation by decays from labeled amino acids was assumed to occur exclusively from β -particle irradiation of phage DNA. If decays originating in DNA are due solely to irradiation of DNA, then the killing efficiencies reflect the energy transfer paths in phage DNA for decays originating in phage DNA and in the protein coat. The energy transfer paths were determined for the two cases with the help of a computer and were found to be very nearly equal to the experimentally determined ratio (2.6). The killing efficiencies for decays originating in phage DNA were 0.12 and for decays originating in protein 0.046. (Author)

A69-19492 *

RESPONSES OF CULTURED CHINESE HAMSTER CELLS TO ULTRAVIOLET LIGHT OF DIFFERENT WAVELENGTHS

Paul Todd, Thomas P. Coohill, and Judith A. Mahoney (Pennsylvania State University, Dept. of Biophysics, University Park, Pa.) Radiation Research, vol. 35, Aug. 1968, p. 390-400. 36 refs. AEC Contract No. AT (30-1)-3834, Grants No. NSG-324, No. NGR-39-009-008.

Experimental investigation of the response of cultured Chinese hamster cells, line M3-1, exposed to UV light from a large water-prism monochromator. Wavelengths used ranged from 2300 to 3664 Å. The ability of single cells to form visible colonies was assessed, and survival curves so obtained were found to be qualitatively similar in the wavelength range from 2481 to 2923 Å, with all curves having extrapolation numbers of about 4 ± 1. The maximally effective wavelength was found to be in the vicinity of 2700 Å, and the action spectrum exhibited a broad minimum from 2500 to 2800 Å. Fractionated exposures to 2652 and 2803-Å light gave similar dependencies of colony-formation survival on the time elapsed between two exposures. The results are interpreted as indicative that the same group of photon-absorbing molecules is responsible for the inhibition of colony development at all wavelengths used, and that proteins as well as nucleic acids may be involved. M M

A69-19493 *

THE CONVERSION OF AMBER SUPPRESSORS TO OCHRE SUPPRESSORS.

Stanley Person and Mary Osborn (Pennsylvania State University, Biophysical Dept., University Park, Pa.) National Academy of Sciences, Proceedings, vol. 60, July 1968, p. 1030-1037. 26 refs. NSF Grant No. GB-4485, Grants No. NSG-324, No. NGR-39-009-008.

Description of evidence showing the derivation of ochre suppressors from each of the three known amber suppressors in the RNA of a bacterium or bacteriophage. The derivation was performed by means of a specific mutagen, uracil-5H³ decay, that is thought to cause C → T changes (Osborn et al., 1967, and Funk, 1967). In *E. coli*, uracil and cytosine are rapidly interconverted so that the radioactive decays that produce a majority of mutations when a cell is labeled with uracil-5H³ or cytosine-5H³ originate as labeled cytosine residues incorporated into the DNA. M M

A69-19494 *

IONIZING RADIATION-INITIATED DEGRADATION OF DEOXYRIBONUCLEIC ACID IN BACTERIA - A POSSIBLE ROLE FOR DEFECTIVE PROPHAGE.

Leo J. Grady and Ernest C. Pollard (Pennsylvania State University, Biophysics Dept., University Park, Pa.) Radiation Research, vol. 36, Oct. 1968, p. 68-86. 62 refs. AEC Contract No. AT (30-1)-2804, Grants No. NSG-324, No. NGR-39-009-008.

The report summarizes data from experiments investigating a correlation between cellular capacity to synthesize macromolecules and the extent of deoxyribonucleic acid (DNA) degradation in bacteria exposed to ionizing radiation. It is shown that a relationship exists between conditions leading to an increase in degradation and those that would be expected to inhibit the induction of a prophage. Since the organisms used were known to harbor a defective prophage, additional experiments were carried out comparing under various conditions the response to ionizing radiation of *Escherichia coli* 15 T⁻ and a cured derivative. In addition, an effort was made to relate the presence of the defective prophage to colony-forming ability after irradiation. The results led to the hypothesis that the presence of the prophage results in less degradation than would otherwise be observed and may also be responsible for increased survival under certain conditions. (Author)

A69-19497 *

MASS SPECTROMETRY IN STRUCTURAL AND STEREOCHEMICAL PROBLEMS. CLXI - ELUCIDATION OF THE COURSE OF THE CHARACTERISTIC RING D FRAGMENTATION OF STEROIDS

L. Tokés, Carl Djerassi (Stanford University, Dept. of Chemistry, Stanford, Calif.), and G. Jones. American Chemical Society, Journal, vol. 90, Sept. 25, 1968, p. 5465-5477. 45 refs. NIH Grant No. CA-07195, Grants No. NSG-81-60, No. NGR-05-020-004.

Discussion of the mechanistic and structural significance of the electron-impact induced fragmentation of ring D in steroids, which involves loss of carbon atoms 15, 16, and 17, together with their substituents. This appears to be the most general fragmentation of steroids and lends itself to a convenient determination of the length of the C-17 side chain. These fissions of the 13-17 and 14-15 bonds occur with and without the apparent transfer of a hydrogen atom, and several mechanistic proposals have been made during the past 10 years about the nature of these processes. It has now been found that the cleavage of the 13-17 and 14-15 bonds is not a simple reaction but rather involves the reciprocal transfer of hydrogens from C-16 and C-18, apparently to make possible the expulsion of an olefin rather than of a cyclopropane. M M

A69-19501 *

MAGNITUDE ESTIMATION OF PERCEIVED DISTANCE OVER VARIOUS DISTANCE RANGES

Robert J. Vincent, Bill R. Brown, Robert P. Markley, and Malcolm D. Arnoult (Texas Christian University, Fort Worth, Tex.) Psychonomic Science, vol. 13, no. 6, 1968, p. 303, 304. 15 refs. Contract No. NAS 2-1481, Grant No. NGR-44-009-018.

Three groups of observers made magnitude estimation judgments of the apparent distance of a stationary space vehicle model under conditions simulating outer space. Psychophysical functions for three stimulus ranges were obtained. The exponents for the near and far stimulus ranges were 1.0. The power function exponent for the "full" range group was 0.48. The psychophysical scales were compared to JND scales obtained in previous research. The results indicated that in all ranges investigated the power law is an appropriate description of the relationship between perceived and objective distance, but that distance range and the location of the range are important determinants of the psychophysical scale. (Author)

A69-19503 *

NONSENSE SUPPRESSION IN A MULTIAUXOTROPHIC DERIVATIVE OF *ESCHERICHIA COLI* 15 T⁻ - IDENTIFICATION AND CONSEQUENCES OF AN AMBER TRIPLET IN THE DEOXYRIBOMUTASE

GENE.

R C Bockrath, Mary Osborn, and Stanley Person (Sussex, University, School of Biology, Brighton, England, Pennsylvania State University, Biophysics Dept., University Park, Pa.) *Journal of Bacteriology*, vol 96, July 1968, p 146-153 16 refs Research supported by the Medical Research Council of England, PHS Grant No GB-4485, Grants No NSG-324, No. NGR-39-009-008

Demonstration that revertants of *Escherichia coli* WWU containing an amber suppressor show the aberrant morphology and are also able to catabolize thymidine for energy and carbon This is in contrast to the parent *E. coli* WWU containing no suppressor, which shows a normal morphology and cannot use thymidine as an energy source. It is suggested that the aberrant arginine revertants are analogous to high thymine-requiring mutants and that, in general, high and low thymine-requiring mutants differ from one another in their ability to catabolize deoxyribose-1-phosphate M. M.

A69-19505 *

THE DEGREE OF ORGANIZATION IN THE BACTERIAL CELL Ernest C. Pollard (Pennsylvania State University, Biophysics Dept., University Park, Pa.)

IN FORMATION AND FATE OF CELL ORGANELLES, INTERNATIONAL SOCIETY FOR CELL BIOLOGY, SYMPOSIUM, CAMBRIDGE, ENGLAND, SEPTEMBER 1967, PROCEEDINGS. VOLUME 6.

Edited by K B Warren.

New York, Academic Press, Inc., 1968, p 291-303 7 refs. Grants No NSG-324, No NGR-39-009-008.

Description of evidence showing that the DNA in the bacterial cell must be so organized as to be able to hold a triphosphate pool in place Two points - one theoretical, the other experimental - regarding internal pools are made which suggest the probability of an internal DNA pool. The current knowledge about the order of the DNA in the bacterial cell is discussed It is pointed out that the philosophy which arises from the structure of the bacterial cell suggested by the studies performed does not necessarily require the concept of detailed order in a cell. Rather it suggests that the bacterial cell started out relatively unordered, but gradually evolutionary mechanisms have given their components order and position to aid growth and to create a more efficient cell. M. M.

A69-19618

ESTABLISHMENT OF PERMISSIBLE IRRADIATION DOSES DURING SPACEFLIGHT PLANNING

B I Davydov, V V Antipov, and P P Saksonov (Kosmicheskie Issledovaniya, vol 6, May-June 1968, p 450-470) *Cosmic Research*, vol 6, May-June 1968, p 380-396 78 refs Translation

Discussion of permissible doses of irradiation for spacecraft crews making flights of short and long duration The role of various criteria (somatic effects, shortening of the life span, leukemia, genetic damage) in the establishment of admissible doses is considered New, specific criteria (ability of the irradiated organism to withstand the extreme conditions of exposure to factors of flight) are examined, and the tolerable level of exposure of the astronaut to ionizing radiation is assessed The concept of the "planned dose" is introduced, and the "dose of justified risk" is defined The importance of heterogeneous irradiation with different types of ionizing radiation is stressed Calculated data are given for the values of tolerable doses during planning of space flights involving exposure to dynamic flight factors and uneven irradiation (screening of the head and abdominal viscera) P. v T

A69-19709 *

INHIBITION OF γ -RAY-INDUCED DEGRADATION OF *E. COLI* B₉-1 DNA BY INFECTION WITH T1, T2 AND T4 BACTERIOPHAGE J. D. Chapman, J. Swetz, and E. C. Pollard (Pennsylvania State University, Dept. of Biophysics, University Park, Pa.). *Nature*, vol. 218, May 18, 1968, p 690-693. 15 refs. AEC-supported research, Grant No. NGR-39-009-008.

Experimental demonstration of how the attachment of bacterio-

phages T1, T2, and T4 to actively degrading *E. coli* B₉-1 is effective in completely inhibiting the host enzyme system which mediates DNA breakdown due to ionizing radiation. The effect of adding T1 phage at a multiplicity of infection of three to a bacterial culture which had been exposed to 22.5 krad of radiation is shown. Experiments using lower multiplicities of infection indicate that the attachment of one phage to a degrading bacterial cell is sufficient to inhibit the process. M. M.

A69-19725

A VISCOELASTIC MODEL OF THE HUMAN SPINE SUBJECTED TO g_z ACCELERATIONS

C T Terry (USAF, Research and Development Command, Office of Surgeon General, Washington, D C) and Verne L Roberts (Michigan, University, Highway Safety Research Institute, Ann Arbor, Mich.)

Journal of Biomechanics, vol. 1, July 1968, p 161-168 11 refs

Description of a viscoelastic rod model of the human spine, which includes damping and is used to simulate the spinal column mathematically This one-dimensional rod was subjected to a ramp input acceleration, and the theoretical acceleration at the end of the rod was compared to the experimental head acceleration data from previously conducted cadaver tests The need for an accurate mathematical model of the spine subject to g_z acceleration arises from the problems involved in the seat ejection of pilots from aircraft The mathematical model is used in subtolerance level testing of volunteers and cadavers for extrapolation in the prediction of spinal failure due to acceleration Results show that the overall response of the viscoelastic rod closely approximates the true acceleration response They also point to further modifications, such as the use of a viscous element in which the viscosity is a function of the strain rate It is suggested that model modification continue until a discrete number of mass-spring-dashpot elements (one for each vertebra) is achieved, in order to collect more complex experimental data on the quantitative and qualitative behavior of the individual components of the spinal column B H

A69-19726 *

TRANSMISSION CHARACTERISTICS OF AXIAL WAVES IN BLOOD VESSELS.

M Anliker, W E Moritz (Stanford University, Dept of Aeronautics and Astronautics, Stanford, Calif.), and E Ogden (NASA, Ames Research Center, Environmental Biology Div., Moffett Field, Calif.)

(Society for Experimental Stress Analysis, Spring Meeting, Albany, N Y, May 7-10, 1968, Paper 1350)

Journal of Biomechanics, vol 1, Dec 1968, p 235-246 23 refs Grant No NGR-05-020-223

[For abstract see issue 24, page 4525, Accession no A68-45611]

A69-19727 *

COMPUTER MODELING OF THE HUMAN SYSTEMIC ARTERIAL TREE

M F Snyder, V C Rideout (Wisconsin, University, Dept of Electrical Engineering, Madison, Wis.), and R J Hillestad (Lockheed Aircraft Corp., Burbank, Calif.)

Journal of Biomechanics, vol 1, Dec 1968, p 341-353 25 refs Research supported by the Wisconsin Alumni Research Foundation, Grant No NGR-50-002-083

A model of the human systemic arterial tree has been devised, based on a lumped-parameter-circuit approximate form This model has been set up and studied on an analog computer A feature of this simulation is the division of the arterial system into sections whose lengths are inversely proportional (approximately) to their cross-sectional area - or what is termed "equal-volume" modeling Great care was exercised in the determination of the model parameters, using expressions for these parameters from a recent paper by Rideout and Dick (1967) on fluid flow in distensible tubes, with numerical values based on measurements reported in the medical literature The simulated pressure and flow waveforms obtained with the model compare favorably with data recorded from the normal

A69-19808

adult human, and exhibit such well-known features as distal delay and peaking of pressure pulses. The aortic input impedance vs frequency curve checks well against measurements on the human. The model also provides a simple means for determination of cardiac output, cardiac work, and cardiac power under various assumed conditions such as variation of heart rate (Author)

A69-19808

5-YEAR FORECAST FOR CONTAMINATION CONTROL

Daniel M. Garst (Sandia Corp., Sandia Laboratories, Planetary Quarantine Systems Support Div., Albuquerque, N. Mex.)

Contamination Control, vol. 8, Feb. 1969, p. 24-26, 34

Discussion of the expected development of pollution control within the next five years. Pollution control will make progress toward achieving true professional stature. The contamination control specialist must have a broad academic and experience background in the industry in which he works as well as a comprehensive knowledge of contamination control. The systems approach is being used increasingly as a tool for solving contamination control problems. G. R.

A69-19826

RADIATION DANGER DURING PROLONGED SPACE FLIGHTS AND RADIOBIOLOGICAL INVESTIGATIONS

E. I. Vorob'ev, Iu. G. Grigor'ev, E. E. Kovalev, and V. A. Sakovich (Kosmicheskaya Biologiya i Meditsina, vol. 2, Mar.-Apr. 1968, p. 3-6)

Environmental Space Sciences, vol. 2, Mar.-Apr. 1968, p. 86-88
Translation

A69-19827

SOME RESULTS OF THE BIOMEDICAL EXPERIMENT ON THE BIOSATELLITE "KOSMOS-110"

V. V. Parin, V. N. Pravetskiy, N. N. Gurovskiy, Iu. G. Nefedov, B. B. Egorov, A. A. Kiselev, S. O. Nikolaev, and B. N. Iurov (Kosmicheskaya Biologiya i Meditsina, vol. 2, Mar.-Apr. 1968, p. 7-14)

Environmental Space Sciences, vol. 2, Mar.-Apr. 1968, p. 89-94
14 refs. Translation

A69-19828

QUANTITATIVE EVALUATION OF THE ACTIVITY OF ANIMAL CARDIOVASCULAR SYSTEMS DURING PROLONGED ORBITAL FLIGHT

Iu. G. Nefedov, N. N. Gurovskiy, A. D. Egorov, B. B. Egorov, A. A. Kiselev, S. O. Nikolaev, A. P. Poliakov, and I. B. Svistunov

(Kosmicheskaya Biologiya i Meditsina, vol. 2, Mar.-Apr. 1968, p. 14-22)

Environmental Space Sciences, vol. 2, Mar.-Apr. 1968, p. 95-100
9 refs. Translation

A69-19829

FEEDING OF EXPERIMENTAL ANIMALS IN SPACE FLIGHTS

K. V. Smirnov and A. A. Lepskiy

(Kosmicheskaya Biologiya i Meditsina, vol. 2, Mar.-Apr. 1968, p. 23-25)

Environmental Space Sciences, vol. 2, Mar.-Apr. 1968, p. 101-103
18 refs. Translation.

A69-19830

FUNCTIONAL STATE OF THE BLOOD-CLOTTING SYSTEM IN DOGS AFTER A 22-DAY FLIGHT IN THE "KOSMOS-110" ARTIFICIAL EARTH SATELLITE

O. D. Anashkin

(Kosmicheskaya Biologiya i Meditsina, vol. 2, Mar.-Apr. 1968, p. 26-30)

Environmental Space Sciences, vol. 2, Mar.-Apr. 1968, p. 104-107
20 refs. Translation

A69-19831

THE EFFECT OF HIGH OXYGEN CONCENTRATIONS ON THE ANIMAL ORGANISM

N. A. Agadzhanian, M. S. Gaevskaya, V. M. Zemskov, I. R. Kalinichenko, G. D. Kniazeva, M. F. Kolesnikova, I. V. Konstantinova, A. V. Sergienko, L. M. Slez, and V. P. Smirnov

(Kosmicheskaya Biologiya i Meditsina, vol. 2, Mar.-Apr. 1968, p. 30-37)

Environmental Space Sciences, vol. 2, Mar.-Apr. 1968, p. 108-114
24 refs. Translation

A69-19832

CLINICAL AND MORPHOLOGICAL CHARACTERISTICS OF HEMODYNAMIC PECULIARITIES IN THE VASCULAR SYSTEM OF EYES OF RABBITS EXPOSED TO ACCELERATION

E. S. Kotova and E. A. Savina

(Kosmicheskaya Biologiya i Meditsina, vol. 2, Mar.-Apr. 1968, p. 38-43)

Environmental Space Sciences, vol. 2, Mar.-Apr. 1968, p. 115-119
7 refs. Translation

A69-19833

ISOLATION OF METABOLIC PRODUCTS FROM CULTURE BROTHS OF CHLORELLA

V. V. Shaidorova, E. K. Lebedeva, V. V. Krasnoshchekov, and V. I. Iazdovskiy

(Kosmicheskaya Biologiya i Meditsina, vol. 2, Mar.-Apr. 1968, p. 43-47)

Environmental Space Sciences, vol. 2, Mar.-Apr. 1968, p. 120-123
20 refs. Translation

A69-19834

INVESTIGATION OF THE DECOMPOSITION OF UREA BY UREASE IN RELATION TO SPACE CABIN LIFE SUPPORT SYSTEMS

M. I. Beliakova, B. G. Gusarov, V. V. Krasnoshchekov, and Iu. E. Siniak

(Kosmicheskaya Biologiya i Meditsina, vol. 2, Mar.-Apr. 1968, p. 48-50)

Environmental Space Sciences, vol. 2, Mar.-Apr. 1968, p. 124-126
Translation

A69-19835

QUALITATIVE AND QUANTITATIVE DISTRIBUTION OF BONE MARROW IN ADULT DOGS

P. A. Korzhuev, T. N. Glazova, I. O. Alakrinskaya, and M. P. Kalandarova

(Kosmicheskaya Biologiya i Meditsina, vol. 2, Mar.-Apr. 1968, p. 51-55)

Environmental Space Sciences, vol. 2, Mar.-Apr. 1968, p. 127-130
10 refs. Translation

A69-19836

A MINIATURE TELEMETRIC DEVICE FOR TRANSMITTING ELECTROMYOGRAMS

T. S. Cherviakova and V. V. Tiazhelov

(*Kosmicheskaya Biologiya i Meditsina*, vol. 2, Mar.-Apr. 1968, p. 55-58.)

Environmental Space Sciences, vol. 2, Mar.-Apr. 1968, p. 131-133
6 refs. Translation

A69-19837

EFFECT OF PROLONGED RESTRICTION OF MUSCULAR ACTIVITY ON THE HUMAN BODY AND THE HYPOKINETIC COMPONENT OF WEIGHTLESSNESS

L. I. Kakurin

(*Kosmicheskaya Biologiya i Meditsina*, vol. 2, Mar.-Apr. 1968, p. 59-63.)

Environmental Space Sciences, vol. 2, Mar.-Apr. 1968, p. 134-137
11 refs. Translation

A69-19838

CHANGES IN PHYSIOLOGICAL FUNCTIONS DURING PROLONGED CONFINEMENT IN A CLOSED RESTRICTED SPACE

B. A. Dushkov, A. N. Zolotukhin, and F. P. Kosmolinski

(*Kosmicheskaya Biologiya i Meditsina*, vol. 2, Mar.-Apr. 1968, p. 64-70.)

Environmental Space Sciences, vol. 2, Mar.-Apr. 1968, p. 138-142
11 refs. Translation

A69-19839

INTERFERENCE TOLERANCE IN MENTAL ACTIVITY

V. V. Suvorova and Z. G. Turovskaya

(*Kosmicheskaya Biologiya i Meditsina*, vol. 2, Mar.-Apr. 1968, p. 70-76.)

Environmental Space Sciences, vol. 2, Mar.-Apr. 1968, p. 143-147
18 refs. Translation

A69-19840

THE ROLE OF THE VESTIBULAR ANALYZER IN HUMAN SPACE ORIENTATION DURING WEIGHTLESSNESS IN AIRPLANE FLIGHTS

V. I. Lebedev and I. F. Chekurda

(*Kosmicheskaya Biologiya i Meditsina*, vol. 2, Mar.-Apr. 1968, p. 76-79.)

Environmental Space Sciences, vol. 2, Mar.-Apr. 1968, p. 148-150
7 refs. Translation

A69-19927

CHANGE IN THE NATURE OF THE RADIOPROTECTIVE EFFECT OF PROPYL GALLATE DURING PROTON AND GAMMA IRRADIATION OF POTATOES

Iu. I. Shaidorov, D. F. Gertsuskii, I. S. Skukina, I. V. Nikitina, and L. V. Alekseenko.

(*Kosmicheskaya Biologiya i Meditsina*, vol. 2, Jan.-Feb. 1968, p. 18-21.)

Environmental Space Sciences, vol. 2, Jan.-Feb. 1968, p. 13-16.
9 refs. Translation.

A69-19928

BODY WEIGHT AND PROTEIN SYNTHESIS IN ANIMALS DURING HYPOKINESIA

I. V. Fedorov, Iu. I. Milov, V. N. Vinogradov, and L. A. Grishina.

(*Kosmicheskaya Biologiya i Meditsina*, vol. 2, Jan.-Feb. 1968, p. 22-24.)

Environmental Space Sciences, vol. 2, Jan.-Feb. 1968, p. 17-19.
13 refs. Translation

A69-19929

INFLUENCE OF PROLONGED HYPOKINESIA ON THE ALTITUDE TOLERANCE OF WHITE RATS

N. A. Agadzhanian and G. V. Machinskii

(*Kosmicheskaya Biologiya i Meditsina*, vol. 2, Jan.-Feb. 1968, p. 25-28.)

Environmental Space Sciences, vol. 2, Jan.-Feb. 1968, p. 20-23
14 refs. Translation.

A69-19930

EFFECT OF LATERAL ACCELERATION ON NEUROSECRETORY FUNCTION OF NUCLEI IN ANTERIOR HYPOTHALAMUS

L. A. Andrianova.

(*Kosmicheskaya Biologiya i Meditsina*, vol. 2, Jan.-Feb. 1968, p. 28-32.)

Environmental Space Sciences, vol. 2, Jan.-Feb. 1968, p. 24-27
14 refs. Translation.

A69-19931

MAINTENANCE OF FUNCTIONAL STABILITY UNDER COMPLEX EXPERIMENTAL CONDITIONS BY MEANS OF REGULAR PHYSICAL EXERCISES.

A. V. Korobkov, S. G. Zharov, A. A. Korobova, and L. A. Ioffe.

(*Kosmicheskaya Biologiya i Meditsina*, vol. 2, Jan.-Feb. 1968, p. 32-37.)

Environmental Space Sciences, vol. 2, Jan.-Feb. 1968, p. 28-32
13 refs. Translation.

A69-19932

MAINTENANCE OF PHYSIOLOGICAL FUNCTIONS IN CONDITIONS OF HYPOKINESIA BY PHYSICAL EXERCISES

M. A. Cherepakhin.

(*Kosmicheskaya Biologiya i Meditsina*, vol. 2, Jan.-Feb. 1968, p. 37-42.)

Environmental Space Sciences, vol. 2, Jan.-Feb. 1968, p. 33-37.
13 refs. Translation.

A69-19933

TOLERANCE OF HUMANS TO PHYSICAL STRESS DURING A FOUR MONTH STAY IN A CLOSED SPACE

L. R. Iseev and Iu. G. Nefedov

(*Kosmicheskaya Biologiya i Meditsina*, vol. 2, Jan.-Feb. 1968, p. 42-46.)

Environmental Space Sciences, vol. 2, Jan.-Feb. 1968, p. 38-41.
Translation.

A69-19934

A69-19934

FUNCTIONING OF THE OTOLITHIC APPARATUS DURING WEIGHT-LESSNESS IN AIRCRAFT FLIGHTS

A. I. Gorshkov.

(*Kosmicheskaja Biologija i Meditsina*, vol. 2, Jan.-Feb. 1968, p. 46-49.)

Environmental Space Sciences, vol. 2, Jan.-Feb. 1968, p. 42, 43. Translation.

A69-19935

AUTONOMIC PHENOMENA DURING MOTION SICKNESS.

V. N. Barnatskii and A. G. Kuznetsov

(*Kosmicheskaja Biologija i Meditsina*, vol. 2, Jan.-Feb. 1968, p. 49-53.)

Environmental Space Sciences, vol. 2, Jan.-Feb. 1968, p. 44-48. 19 refs. Translation.

A69-19936

MAN-OPERATOR UNDER CONDITIONS OF ACCELERATION.

A. S. Barer, A. S. Eliseev, V. E. Panfilov, and S. A. Rodin
(*Kosmicheskaja Biologija i Meditsina*, vol. 2, Jan.-Feb. 1968, p. 54-58.)

Environmental Space Sciences, vol. 2, Jan.-Feb. 1968, p. 49-52. 19 refs. Translation.

A69-19937

EFFECTS OF ISOLATION AND SENSORY DEPRIVATION.

L. Shvab and Ia. Gross.

(*Kosmicheskaja Biologija i Meditsina*, vol. 2, Jan.-Feb. 1968, p. 58-62.)

Environmental Space Sciences, vol. 2, Jan.-Feb. 1968, p. 53-56. 18 refs. Translation.

A69-19938

MECHANISMS OF SPATIAL ORIENTATION IN FLIGHT AND SOME CAUSES OF ITS DISTURBANCE.

B. S. Aliakrinskii and S. I. Stepanova.

(*Kosmicheskaja Biologija i Meditsina*, vol. 2, Jan.-Feb. 1968, p. 63-68.)

Environmental Space Sciences, vol. 2, Jan.-Feb. 1968, p. 57-61. 14 refs. Translation.

A69-19939

RADIOBIOLOGICAL EVIDENCE ON THE IMPORTANCE OF LOCAL PROTECTION OF THE ASTRONAUT.

Iu. G. Grigor'ev, G. F. Nevskaja, G. M. Abramova, E. V. Ginsburg, and M. P. Kalandarova.

(*Kosmicheskaja Biologija i Meditsina*, vol. 2, Jan.-Feb. 1968, p. 68-72.)

Environmental Space Sciences, vol. 2, Jan.-Feb. 1968, p. 62-65. 14 refs. Translation.

A69-19940

HEAT STRESS DYNAMICS AND LIMITS OF HEAT TOLERANCE IN MAN.

S. M. Gorodinskii, G. V. Bavro, E. M. Perfilova, Iu. G. Pletenskii and S. G. Salivon.

(*Kosmicheskaja Biologija i Meditsina*, vol. 2, Jan.-Feb. 1968, p. 73-81.)

Environmental Space Sciences, vol. 2, Jan.-Feb. 1968, p. 66-73. 25 refs. Translation.

A69-20173 *

ANTIBODY FORMATION IN HIBERNATING GROUND SQUIRRELS (CITELLUS TRIDECIMLINEATUS)

J. M. McKenna and X. J. Musacchia (Missouri, University, School of Medicine, Dept. of Microbiology and Dept. of Physiology and Space Sciences Research Center, Columbia, Mo.)

Society for Experimental Biology and Medicine, Proceedings, vol. 129, Dec. 1968, p. 720-724. 14 refs.
Grant No. NGR-26-004-021

Discussion of an experiment which demonstrates specific antibody formation to influenza A virus vaccine in hibernating *Citellus tridecemlineatus*. Although only a small amount of hemagglutination-inhibiting antibody was formed on primary antigenic stimulation, it was detectable. A true anamnestic response was shown in animals given a booster dose of antigen one month after the initial injection, when these animals were awake at room temperature for 5 days before sacrifice. Whether a true secondary response was obtained entirely in hibernation is not ascertainable, although the geometric mean titer (GMT) was significantly different from the primary GMT. A possible pseudosecondary response was also noted. G R

A69-20174 *

STUDY OF THE SYNERGISTIC EFFECTS OF HEAT EXPOSURE AND IONIZING IRRADIATION IN THE HAMSTER

R. R. J. Chaffee and X. J. Musacchia (California, University, Santa Barbara, Calif., Missouri, University, Dept. of Physiology and Space Sciences Research Center, Columbia, Mo.)

Society for Experimental Biology and Medicine, Proceedings, vol. 129, Dec. 1968, p. 718-720. 6 refs.
Contract No. AF 29(600)-67-C-0009, Grants No. DADA 17-68-C-8064, No. NGR-26-004-021

Discussion of some experiments to determine the effects of prolonged heat exposure and whole-body irradiation on survival time in hamsters. Adult male hamsters were placed in a hot room, 34-35°C, and were heat acclimated for two months. Controls were maintained at 24°C. Each animal was given a single whole-body exposure to ionizing radiation from 60Co source. Half of the heat-acclimated animals were then transferred to 24°C, and half were returned to the hot room. Half of the controls were placed in the hot room after irradiation. Comparisons of survival times were made, heat exposure either before or after irradiation lowered the survival time to less than 50% that of hamsters which were irradiated but not heat exposed. G R

A69-20374 *

ADRENAL EPINEPHRINE AND PHENYLETHANOLAMINE N-METHYLTRANSFERASE (PNMT) ACTIVITY IN THE RAT BEARING A TRANSPLANTABLE PITUITARY TUMOR

Joan Vernikos-Danellis (NASA, Ames Research Center, Environmental Biology Div., Moffett Field, Calif.), R. Ciaranello, and J. Barchas (NASA, Ames Research Center, Environmental Biology Div., Moffett Field, Stanford University, School of Medicine, Palo Alto, Calif.)

Endocrinology, vol. 83, Dec. 1968, p. 1357, 1358. 12 refs.
NIH Grants No. HD-02881, No. MH-13259, Grant No. NGR-05-020-168

Determination of plasma corticosterone and adrenal phenylethanolamine N-methyl transferase (PNMT) in rats bearing a transplantable pituitary tumor for six weeks. Ten male Fischer rats were fed commercial rat chow and water and were maintained at a constant temperature of 24°C. Half the rats were implanted with tumor tissue suspended in saline and injected intramuscularly into the right hind leg. The rats were decapitated six weeks after tumor implantation. It was found that there was a 350% increase in adrenal PNMT and a 160% increase in adrenal epinephrine in the tumor-implanted animals as compared to the controls. G R

A69-20403

MATHEMATICAL FORMULATION OF THE NOY TABLES

R. A. Pinker (Ministry of Technology, National Gas Turbine Establishment, Farnborough, Hants., England)

Journal of Sound and Vibration, vol. 8, Nov. 1968, p. 488-493

A mathematical formulation of the Noy tables has been derived from those in present use. The new tables make possible the use of more efficient programming, and the results differ from those obtained from the original tables only by the same order as the possible degree of accuracy in measurement (Author)

A69-20450

FLIGHT MANAGEMENT CONCEPTS

James R. Gannett (Boeing Co., Seattle, Wash.)

IN AIR LINE PILOTS ASSOCIATION, AIR SAFETY FORUM, 15TH, SEATTLE, WASH., JULY 9-11, 1968, PROCEEDINGS [A69-20449 08-14]

Chicago, Air Line Pilots Association, 1968. 6 p.

Discussion of the guidelines for improved flight deck equipment in future aircraft. The pilot of a modern-day airliner must have information relative to the aircraft's situation, rate of progress with respect to its objectives, and any problems that may develop. It does not appear desirable that all aspects of the operation be fully automated because of the danger that unsatisfactory performance will not be detected early enough. In going over all the required and desired improvements related to flight management, it is apparent that more use must be made of the systems approach. G. R.

A69-20667

THERMAL PROBLEMS IN AEROSPACE MEDICINE

Edited by J. D. Hardy (John B. Pierce Foundation, Laboratory, New York, N. Y., Yale University, New Haven, Conn.), Maidenhead, England, Technivision Services (AGARDograph III), 1968. 259 p. In English and French. \$22.50.

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FOREWORD. J. D. Hardy (John B. Pierce Foundation, New York, N. Y., Yale University, New Haven, Conn.), p. ix.

INTENSE HEAT AND THERMAL RADIATION

CARDIOVASCULAR EFFECTS OF BRIEF INTENSE THERMAL PULSES IN MAN. R. H. Murray (Indiana University, Bloomington, Ind.), p. 3-12. 7 refs. [See A69-20688 08-04]

SKIN TEMPERATURE CHANGES CAUSED BY INTENSE DIFFUSE THERMAL RADIATION. W. C. Kaufman (USAF, Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio), p. 13-20. 15 refs. [See A69-20669 08-04]

EFFECTS OF A SHARP INCREASE OF RADIANT TEMPERATURE ON THE HUMAN ORGANISM [EFFETS SUR L'ORGANISME D'UNE AUGMENTATION BRUTALE DE LA TEMPERATURE RADIANTE]. J. Colin and Y. Houdas (Centre d'Essais en Vol, Brétigny-sur-Orge, Seine-et-Oise, France), p. 21-30. 17 refs. [See A69-20670 08-04]

SKIN AND SUBCUTANEOUS TEMPERATURE CHANGES DURING EXPOSURE TO INTENSE THERMAL RADIATION. J. A. J. Stolwijk and J. D. Hardy (John B. Pierce Foundation, New York, N. Y., Yale University, New Haven, Conn.), p. 31-45. 12 refs. [See A69-20671 08-04]

THERMAL RADIATION. C. R. Underwood, E. J. Ward, and O. G. Edholm (Medical Research Council, London, England), p. 47-55.

THERMAL RADIATION IN THE INVESTIGATION OF CUTANEOUS VASOMOTOR AND SUDOMOTOR CONTROL. D. McK. Kerslake (Royal Air Force, Institute of Aviation Medicine, Farnborough, Hants., England), p. 57-69. 34 refs. [See A69-20672 08-04]

COEFFICIENTS OF HEAT EXCHANGE BY CONVECTION - AN EXPERIMENTAL STUDY [COEFFICIENTS D'ECHANGE DE CHALEUR PAR CONVECTION - ETUDE EXPERIMENTALE]. J. Colin and Y. Houdas (Centre d'Essais en Vol, Brétigny-sur-Orge, Seine-et-Oise, France), p. 71-87. 18 refs. [See A69-20673 08-05]

THERMAL PROTECTION PRINCIPLES. A. M. Stoll and M. A. Chianta (U.S. Naval Material Command, Johnsville, Pa.), p. 89-103. 11 refs. [See A69-20674 08-05]

RESPONSES OF MAN TO THERMAL TRANSIENTS. J. D.

Hardy and J. A. J. Stolwijk (John B. Pierce Foundation, New York, N. Y.), p. 105-127. 40 refs. [See A69-20675 08-04]

EFFECTS OF LASER AND MICROWAVE RADIATION

SOME BIOLOGICAL EFFECTS OF LASER RADIATION. W. T. Ham, Jr., R. C. Williams, W. J. Geeraets, H. A. Mueller, R. S. Ruffin, F. H. Schmidt, and A. M. Clarke (Virginia, Medical College, Richmond, Va.), p. 131-148. 28 refs. [See A69-20676 08-05]

CUTANEOUS RECEPTOR RESPONSE TO MICROWAVE IRRADIATION. E. Hendler (U.S. Naval Material Command, Johnsville, Pa.), p. 149-161. 16 refs. [See A69-20677 08-05]

SOME EFFECTS OF ACUTE AND CHRONIC MICROWAVE IRRADIATION OF MICE. A. S. Hyde and J. J. Friedman (USAF, Wright-Patterson AFB, Ohio, Indiana University, Bloomington, Ind.), p. 163-175. 5 refs. [See A69-20678 08-05]

VISCERAL LESIONS OBSERVED IN MICE AND RATS EXPOSED TO ULTRASHORT WAVES [LESIONS VISCERALES OBSERVEES CHEZ DES SOURIS ET DES RATS EXPOSES AUX ONDES ULTRA-COURTES]. L. Miro, R. Loubiere, and A. Pfister (Ecole Pratique des Hautes-Etudes, Paris, France), p. 177-183. [See A69-20679 08-05]

RETINAL BURN. H. G. Wagner (U.S. Naval Air Engineering Center, Philadelphia, Pa.), p. 185-188. 8 refs. [See A69-20680 08-05]

EXPOSURE OF HUMANS TO HOT AND COLD WATER

A REVIEW OF CURRENT CONCEPTS AND PRACTICES USED TO CONTROL BODY HEAT LOSS DURING WATER IMMERSION. E. L. Beckman (National Naval Medical Center, Bethesda, Md.), p. 191-209. 18 refs. [See A69-20681 08-05]

EFFECTS OF IMMERSION IN COLD WATER ON MAN [EFFETS SUR L'HOMME DE L'IMMERSION DANS L'EAU FROIDE]. Y. Houdas and J. Colin (Centre d'Essais en Vol, Brétigny-sur-Orge, Seine-et-Oise, France), p. 211-216. 11 refs. [See A69-20682 08-05]

SKIN TEMPERATURE AND CUTANEOUS PAIN DURING WARM WATER IMMERSION. J. D. Hardy, J. A. J. Stolwijk, H. T. Hammel, and D. Murgatroyd (John B. Pierce Foundation, New York, N. Y., Yale University, New Haven, Conn.), p. 217-229. 25 refs. [See A69-20683 08-05]

SOME ASPECTS OF PERSONAL COOLING IN INADEQUATELY AIR CONDITIONED COCKPITS. J. M. Clifford (Royal Air Force, Institute of Aviation Medicine, Farnborough, Hants., England), p. 231-242. [See A69-20684 08-05]

SUBJECT INDEX, p. 243-250.

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A69-20668

CARDIOVASCULAR EFFECTS OF BRIEF INTENSE THERMAL PULSES IN MAN

Raymond H. Murray (Indiana University, Bloomington, Ind.)

IN THERMAL PROBLEMS IN AEROSPACE MEDICINE

Edited by J. D. Hardy

Maidenhead, England, Technivision Services (AGARDograph III), 1968, p. 3-12. 7 refs.

Contract No. AF 33(616)-8378

Six clothed human subjects were exposed to brief, intense heat stresses (wall temperatures rising 28°C/min to peaks of 150°C or 205°C) with subsequent passive cooling for a total exposure of twenty minutes. Measurements of heart rate, arterial and venous blood pressure, cardiac output, and derived circulatory indices demonstrated severe strain of cardiovascular compensatory mechanisms. It is suggested that fall in effective blood volume is the critical factor affecting circulatory competence. These stresses approached human tolerance limits. (Author)

A69-20669

SKIN TEMPERATURE CHANGES CAUSED BY INTENSE DIFFUSE THERMAL RADIATION

W. C. Kaufman (USAF, Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio)

A69-20670

IN THERMAL PROBLEMS IN AEROSPACE MEDICINE

Edited by J D Hardy
Maidenhead, England, Technivision Services (AGARDograph III),
1968, p 13-20 15 refs

Results of studies of the effect of intense thermal radiation on cockpits, occupants, and the natural human skin in order to make it possible to predict responses of aircrew members to thermal energy that may arise from fires or nuclear detonation. Aircrew members are coincidentally protected by their canopy or windshield and helmet visor, each of which will significantly attenuate thermal energy. These objects may themselves be damaged by thermal radiation. The uninitiated subject will interpret his exposure as painfully hot at a temperature significantly lower than that producing burns. The temperature increase of natural human skin is approximately one-half that of ink-blackened skin, the condition under which most of the data appearing in the open literature are gathered. Properly applying data such as these, the biologist, meteorologist, and physical scientist can calculate a nearest safe distance, with reasonable assurance of safety, for a variety of combinations of weather conditions and intensities of thermal radiation. P v T

A69-20670

EFFECTS OF A SHARP INCREASE OF RADIANT TEMPERATURE ON THE HUMAN ORGANISM [EFFETS SUR L'ORGANISME D'UNE AUGMENTATION BRUTALE DE LA TEMPERATURE RADIANTE]
J Cohn and Y Houdas (Centre d'Essais en Vol, Brétigny-sur-Orge, Seine-et-Oise, France)

IN THERMAL PROBLEMS IN AEROSPACE MEDICINE.

Edited by J D Hardy
Maidenhead, England, Technivision Services (AGARDograph III),
1968, p 21-30 17 refs In French

Study of the thermoregulatory reactions of the human body by a continuous checking of the weight variations and the cutaneous, rectal, buccal, and tympanic temperatures of naked subjects, before, during, and after a sharp variation of the ambient temperature. Before starting the experiments, the subjects were kept at complete rest in a neutral thermal environment in order to avoid their thermoregulatory centers to be influenced by other factors than temperature variations. The results are based on and limited by the modes of sudation. P v T

A69-20671

SKIN AND SUBCUTANEOUS TEMPERATURE CHANGES DURING EXPOSURE TO INTENSE THERMAL RADIATION

J A J Stolwijk and J D Hardy (John B. Pierce Foundation, Laboratory, New York, N Y, Yale University, School of Medicine, New Haven, Conn.)

IN THERMAL PROBLEMS IN AEROSPACE MEDICINE

Edited by J D Hardy
Maidenhead, England, Technivision Services (AGARDograph III),
1968, p 31-45 12 refs
DASA-supported research

Description of a method of skin-temperature measurement during exposure to high-intensity radiation, and outline of a technique for estimating subcutaneous temperature from skin-temperature data. Radiometric measurements of skin temperature were made on several subjects at room temperatures near 20°C. The low temperature was necessary to prevent the early onset of vasomotor changes and sweating, as it was desired to keep conditions at the skin surface constant for at least one minute. For the first 10 to 15 sec, the skin temperature elevations were entirely proportional to the irradiance and thus could be expected to be least affected by physiological changes and, therefore, should be predicted by theory from straightforward application of standard heat-flow equations, providing sufficient data on the optical and thermal properties of the skin. It is found that proper filtering will reduce significantly the accumulations of heat in the superficial skin layers (pigmented or not) to injurious levels during exposure to high-intensity heat radiation. P v T

A69-20672

THERMAL RADIATION IN THE INVESTIGATION OF CUTANEOUS VASOMOTOR AND SUDOMOTOR CONTROL

D McK Kerslake (Royal Air Force, Institute of Aviation Medicine, Farnborough, Hants, England)

IN THERMAL PROBLEMS IN AEROSPACE MEDICINE

Edited by J D Hardy
Maidenhead, England, Technivision Services (AGARDograph III),
1968, p 57-69 34 refs

Experimental study of the effects of thermal stimuli on the cutaneous vasomotor and sudomotor control of the human organism. The response of the hand blood flow, measured by the plethysmograph, to sudden immersion of the legs in warm water showed that the circulation to the legs was occluded one minute before the first measurement of hand blood flow. The most striking feature is the sudden reduction in blood flow almost to zero as the water was poured into the bath around the legs. This recovers quite rapidly and the vasodilation continues thereafter. The vasoconstriction may be due merely to the sensory stimulus of the water coming into contact with the skin, or it may reflect the complex thermal transients in the skin at this time. It is much easier to demonstrate and study nervous reflex vasodilation when thermal radiation instead of water immersion is used as a stimulus, and in the latter case, the phenomenon may not be manifest. Whether this is because the radiation stimulus can be applied without touching the skin, or whether it is a more effective stimulus to the thermal receptors is not yet clear. In a similar manner, sudomotor reflexes are studied. Here, again, no definite conclusions are reached. P v T

A69-20673

COEFFICIENTS OF HEAT EXCHANGE BY CONVECTION - AN EXPERIMENTAL STUDY [COEFFICIENTS D'ECHANGE DE CHALEUR PAR CONVECTION - ETUDE EXPERIMENTALE]

J Cohn and Y Houdas (Centre d'Essais en Vol, Brétigny-sur-Orge, Seine-et-Oise, France)

IN THERMAL PROBLEMS IN AEROSPACE MEDICINE

Edited by J D Hardy
Maidenhead, England, Technivision Services (AGARDograph III),
1968, p 71-87 18 refs In French

Quantitative analysis of heat exchange between the human organism and its surroundings, from the viewpoint of application to aircraft personnel. An acclimatization calculation is made, and the pertinent equations are derived. The experiments were made under proper ventilation, in order to maintain a sufficiently homogeneous temperature. The results are listed in comprehensive tables. P v T

A69-20674

THERMAL PROTECTION PRINCIPLES

A M Stoll and M A Chianta (U S Naval Material Command, Naval Air Development Center, Johnsville, Pa.)

IN THERMAL PROBLEMS IN AEROSPACE MEDICINE

Edited by J D Hardy
Maidenhead, England, Technivision Services (AGARDograph III),
1968, p 89-103 11 refs

Discussion of protection against intense thermal exposures productive of burns as distinguished from protection against heat loss or gain due to long-term environmental heat exchange. Within this area, the formulation of thermal protection principles depends upon an understanding of the biophysical mechanisms of thermal injury in living skin and of the purely physical processes of heat transfer operative in any given thermal exposure. To provide protection against thermal injury, it is necessary to stipulate the characteristics of the causative agent, to analyze the resultant modes of heat flow, and to construct barriers designed to minimize the heat flow to the skin. It was found that several elements were highly significant in forming a barrier to heat transfer in flame contact: (1) fire-resistant material, (2) a double layer of such material, so that the outer layer constitutes a sacrificial layer which is a barrier to heat transfer until it is destroyed, and (3) an inner layer which also resists ignition. P v T

A69-20675**RESPONSES OF MAN TO THERMAL TRANSIENTS**

J D Hardy and J A J Stolwijk (John B Pierce Foundation, Laboratory, New York, N Y.)
 IN THERMAL PROBLEMS IN AEROSPACE MEDICINE
 Edited by J D Hardy
 Maidenhead, England, Technivision Services (AGARDograph III), 1968, p 105-127 40 refs

Experimental study of the reaction of the human organism to heat exposure, carried out on three young male subjects in good health, aged from 22 to 25 years. The subjects, dressed in shorts, were exposed to a series of increasing temperatures between 25 and 48°C, while maintaining low air movement and keeping the relative humidity below the level which would affect evaporative heat loss. The data obtained are given in tables. The results provide quantitative information for the analysis of thermoregulation in man, under the limited condition of step-function increase in environmental temperature, from a neutral to a warm condition. Both steady state and transient data are now available in limited degree and will be used to guide the construction of a mathematical model of the regulatory system in man.

P v T

A69-20676**SOME BIOLOGICAL EFFECTS OF LASER RADIATION**

W T Ham, Jr, R C Williams, W J Geeraets, H A Mueller, R S Ruffin, F H Schmidt, and A M Clarke (Virginia, Medical College, Richmond, Va.)
 IN THERMAL PROBLEMS IN AEROSPACE MEDICINE
 Edited by J D Hardy
 Maidenhead, England, Technivision Services (AGARDograph III), 1968, p 131-148 28 refs
 Contracts No DA-49-193-MD-2241, No. DA-49-146-XZ-102

Study of the biological effects of laser radiation on the mammalian retina. A radiation dose of approximately 0.07 joule/cm² produces irreversible damage to the rabbit retina from a Q-switched ruby laser (exposure time 30 nsec), whereas it requires approximately 0.85 joule/cm² to produce irreversible damage from a laser pulse lasting for 200 μsec or longer. No definite physical or biological differences between ruby laser pulses and pulsed white light sources of comparable power density have been detected for minimal damage to the rabbit retina. Both types of exposure can be explained adequately in terms of thermal injury using a simplified physical model and the classical law of heat conduction.

P v T

A69-20677**CUTANEOUS RECEPTOR RESPONSE TO MICROWAVE IRRADIATION**

Edwin Hendler (U S Naval Material Command, Naval Air Development Center, Johnsville, Pa.)
 IN THERMAL PROBLEMS IN AEROSPACE MEDICINE
 Edited by J D Hardy
 Maidenhead, England, Technivision Services (AGARDograph III), 1968, p 149-161. 16 refs

Study of the cutaneous warmth sensation produced by microwaves with emphasis on the effects in the human forehead. One microwave source used generated 2500 pulses/sec of energy having a wavelength in air of 3 cm, each pulse being 0.4 μsec in width. Another source produced 300 pulses/sec at a wavelength of 10 cm and a pulse width of 2 μsec. A specially designed radiometer was used for remotely recording skin temperature during microwave irradiation. The subjects indicated whether or not they experienced a warmth sensation, following stimulation, by pressing one of two buttons held in each hand. Thresholds for warmth sensation were established, and an attempt is made to elucidate the mechanism responsible for this effect.

G R

A69-20678**SOME EFFECTS OF ACUTE AND CHRONIC MICROWAVE IRRADIATION OF MICE**

A S. Hyde and J J Friedman (USAF, Wright-Patterson AFB, Ohio, Indiana University, Bloomington, Ind.)
 IN THERMAL PROBLEMS IN AEROSPACE MEDICINE
 Edited by J D Hardy
 Maidenhead, England, Technivision Services (AGARDograph III), 1968, p 163-175 5 refs
 Contract No Nonr-475(03)

Discussion of the effects of exposure to microwave radiation on the body weight and peripheral blood hemograms of mice. The conditions of the experiment are described, and the dosages for experimental and control groups are detailed. It is shown that the change in body temperature was indifferent to a wide range of power densities and frequencies (pulse repetition rates), and related only to total power, thus throwing some doubt on the rationale of a maximum permissible dose which is based on incident energy level. A variety of bizarre alterations in body weight are shown to result from exposures to modest energy levels. The results of the experiment lead to the conclusion that present "maximum safe exposure" levels, arbitrarily selected more than 10 years ago, should be carefully reviewed, in view of the fact that microwave generators have increased their output during this period from 10 W to the megawatt range.

B H

A69-20679**VISCERAL LESIONS OBSERVED IN MICE AND RATS EXPOSED TO ULTRASHORT WAVES (LESIONS VISCERALES OBSERVEES CHEZ DES SOURIS ET DES RATS EXPOSES AUX ONDES ULTRA-COURTES)**

L Miro, R Loubiere, and A Pfister (Ecole Pratique des Hautes-Etudes, Laboratoire, Paris, France)
 IN THERMAL PROBLEMS IN AEROSPACE MEDICINE
 Edited by J D Hardy
 Maidenhead, England, Technivision Services (AGARDograph III), 1968, p 177-183. In French
 Research supported by the Direction des Recherches et Moyens d'Essais

Attempt to determine whether exposure of mice and rats to ultrashort waves (3000 MHz) would cause damage other than that due to heating. It was found that total irradiation, whether for a long period (eliminating the heating effect), or with high-energy densities for a short exposure time, did not involve any pathological modification of the physiology of reproduction. Macroscopic and microscopic examination of all animals subjected to ultrashort waves, even those which died from the heating effect, showed the gonads to be normal. No morphological sign indicates that these waves involve gonadic malfunction. These findings are regarded as reassuring to radar maintenance personnel.

F R L

A69-20680**RETINAL BURN**

H G Wagner (U S Naval Air Engineering Center, Philadelphia, Pa.)
 IN THERMAL PROBLEMS IN AEROSPACE MEDICINE
 Edited by J D Hardy
 Maidenhead, England, Technivision Services (AGARDograph III), 1968, p 185-188 8 refs.

Discussion of the consequences of retinal burn from prolonged direct viewing of the sun, either directly or during an eclipse, or from some other high-energy yield source such as the laser or a thermonuclear explosion. Retinal burns involve both the retina and the choroid, leading to appreciable loss by destruction and alteration of receptors and pigment cells. It is assumed that injuries of this severity lead to permanent visual loss in the affected area, since the ability of the retina to heal itself is rather poor. The speed with which retinal burn occurs must be considered in the development of any protective device.

B H

A69-20681

A69-20681

A REVIEW OF CURRENT CONCEPTS AND PRACTICES USED TO CONTROL BODY HEAT LOSS DURING WATER IMMERSION
E. L. Beckman (National Naval Medical Center, Bethesda, Md.)
IN THERMAL PROBLEMS IN AEROSPACE MEDICINE

Edited by J. D. Hardy
Maidenhead, England, Technivision Services (AGARDograph III),
1968, p 191-209 18 refs

Discussion of methods to control the heat loss of the human body during water immersion. Such methods are of great significance to downed aviators and underwater swimmers. Fundamental aspects concerning the heat loss of the human body during water immersion are discussed. Advances in clothing and textile technology suggest that improved insulative garments might be useful. In addition, the newer technologies of direct energy conversion systems, thermoelectrics, electrochemistry, and thermionics suggest that systems for replacement of body heat may be available at an acceptable weight penalty which would simplify the problem of keeping the immersed swimmer in thermal balance. G. R.

A69-20682

EFFECTS OF IMMERSION IN COLD WATER ON MAN [EFFETS SUR L'HOMME DE L'IMMERSION DANS L'EAU FROIDE].

Y. Houdas and J. Colin (Centre d'Essais en Vol, Brétigny-sur-Orge, Seine-et-Oise, France)

IN THERMAL PROBLEMS IN AEROSPACE MEDICINE

Edited by J. D. Hardy
Maidenhead, England, Technivision Services (AGARDograph III),
1968, p 211-216 11 refs In French

Study of the effect of cold water immersion on man from the physiological and physiopathological aspects, and examination of the effect of clothing. Heat exchanges occurring in a nude subject were investigated, as well as those occurring in a subject clothed only in a neoprene combination, and a subject wearing a neoprene combination outside a pilot's normal clothing. Experiments were carried out on nude subjects at 15°C and on clothed subjects at 10 and 5°C. Subjects clothed in a neoprene combination outside normal clothing could easily tolerate immersion at 5°C for an hour. F. R. L.

A69-20683

SKIN TEMPERATURE AND CUTANEOUS PAIN DURING WARM WATER IMMERSION

J. D. Hardy, J. A. J. Stolwijk, H. T. Hammel, and D. Murgatroyd (John B. Pierce Foundation, Laboratory, New York, N. Y., Yale University, School of Medicine, New Haven, Conn.)

IN THERMAL PROBLEMS IN AEROSPACE MEDICINE

Edited by J. D. Hardy
Maidenhead, England, Technivision Services (AGARDograph III),
1968, p 217-229 25 refs
PHS Grant No. GM-10289, Contract No. DA-49-146-XZ-124

Description of experiments undertaken to gather information regarding pain stimulated at skin temperatures in the range of 36 to 41°C, and to test the hypothesis that heat pain results from subcutaneous thermal gradients. Reports of pain were obtained for all subjects at 38.7°C and for one subject at 36.8°C. Previous experiments had placed critical skin temperature near 45°C as the threshold of thermal, cutaneous pain sensation. Values of the temperature gradients between the most superficial layers of the skin model were calculated, leading to the conclusion that the thermal gradient theory as the explanation of the cause of pain cannot be substantiated. B. H.

A69-20684

SOME ASPECTS OF PERSONAL COOLING IN INADEQUATELY AIR CONDITIONED COCKPITS

J. M. Clifford (Royal Air Force, Institute of Aviation Medicine, Farnborough, Hants., England)

IN THERMAL PROBLEMS IN AEROSPACE MEDICINE

Edited by J. D. Hardy
Maidenhead, England, Technivision Services (AGARDograph III),
1968, p 231-242

Discussion of approaches to provide thermal comfort to personnel in inadequately air-conditioned cockpits. Adequate cabin air conditioning systems are impractical in some cases. Man's microclimate can be cooled in three ways. Warm but dry air can be used to maintain thermal equilibrium by cooling by the evaporation of sweat. High-mass flows of cool or cold air can be delivered at the skin surface by specialized air-ventilated suits, which distribute the air in such a manner as to prevent chilling of the trunk of the body. The third method uses liquid circulated through tubes near the skin as the coolant. G. R.

A69-20685 *

TWO VISUAL SYSTEMS

Gerald E. Schneider (Massachusetts Institute of Technology, Cambridge, Mass.)

Science, vol 163, Feb 28, 1969, p 895-902 48 refs

PHS Grant No. NB-06542, Grant No. NSG-496

Experimental demonstration of different brain mechanisms for visual localization and discrimination, by means of tectal and cortical lesions in golden hamsters. It is concluded that fundamentally different types of relative blindness are produced by ablation of cortical or tectal visual areas of the hamster's brain. Undercutting the superior colliculus abolishes the ability to orient toward an object, but not the ability to identify it, according to tests of pattern discrimination learning. Ablating cortical visual areas has reciprocally opposite effects. The results may be interpreted as a dissociation between mechanisms for two types of visuomotor control which are maintained throughout vertebrate evolution. One mechanism is concerned with the locating of objects, insofar as the orientation of the head and body toward a stimulus is involved. The other mechanism is concerned with the specific identification of objects, and with actions directed toward or away from them. B. H.

A69-21146

IMPROVED SUIT PROPOSED FOR LUNAR WEAR

Warren C. Wetmore

Aviation Week and Space Technology, vol 90, Mar 3, 1969,
p 51, 54, 55, 57, 58

Description of principal improvements in the proposed A9L lunar suit, over the A7L Apollo lunar landing suit, for greater comfort and mobility. Specific improvements include (1) a waist joint for easier bending and squatting, as well as higher stepping, (2) a neck joint for better up-down visibility, (3) a special zipper around the torso for easier donning, (4) a jacket-type thermal meteoroid garment (TMG) that can be removed inside the spacecraft, and (5) a drinking/eating port in the neck joint under the astronaut's chin, rather than in the left side of the bubble pressure helmet. A detailed schedule for producing and qualifying the A9L by December 1969 has been submitted to NASA, and the suit has been tested by several NASA astronauts. Although not yet officially accepted, the suit could be flown operationally by the end of 1969. B. H.

A69-21183

PHYSIOLOGICAL LONG-TIME EFFECTS IN ROTATING SYSTEMS [PHYSIOLOGISCHE LANGZEITEFFEKTE IN ROTIERENDEN SYSTEMEN]

Wolfgang Briegleb (Deutsche Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugmedizin, Bad Godesberg, West Germany).

Naturwissenschaftliche Rundschau, vol 21, Dec 1968, p 507-512
24 refs In German
(DVL-861)

Discussion of experiments to investigate the reactions of organisms to extended periods of rotation. A survey is given of a wide variety of acceleration effects on organisms which can be investigated in rotating systems. Oyama and his associates (1965, 1967) have studied biochemical changes found in centrifuged rats. A number of experiments are discussed in which human beings were subjected to extended stays in rotating systems such as the "counter-rotating apparatus" and the "slow rotating room" described by Graybiel (1967). G. R.

LC ENTRIES

A69-80548

VOICE COMMUNICATION PROBLEMS IN SPACECRAFT AND UNDERWATER OPERATIONS

Russell L Sergeant (Naval Submarine Med Res Lab, Groton Conn)

Annals of the New York Academy of Sciences, vol 155 Nov 20 1968, p 342-350 26 refs

A general description of speech was presented for environments in outer space and within the oceans. Special problems arise when communication systems for operations within these environments are considered. Noise, vibrations, unusual breathing mixtures, and restrictions due to fitting of masks and helmets can interfere with the talker's ability to produce intelligible speech. Many of these conditions also interfere with listening. More intelligible and more natural-sounding helium speech can be achieved in several different ways, each having its advantages and disadvantages. The electronic link between the talker and the listener introduces many situations that may be unfamiliar to the communications engineer. In addition to revised calibration techniques, problems of waterproofing, size and weight restrictions, and pressure-proofing of components must be solved. The effectiveness of any communication system can be increased by adherence to circuit discipline, simple training to speak clearly, and utilization of vocabularies specific to the immediate operation.

A69-80549

INTERPRETIVE STUDY OF EVOKED RESPONSES ELICITED BY GROSS SACCADIC EYE MOVEMENTS

Kenneth Gaarder (Veterans Admin Hosp, Washington, D C)

Perceptual and Motor Skills, vol 27 part 1, Dec 1968 p 683-703 52 refs

A model of visual perception is outlined in which the sudden shifts of the retina caused by saccadic (jumping) eye movements generate discrete, discontinuous packages or units of information which are transmitted to the cortex as evoked responses. An experiment is described where gross saccadic eye movements across a particular stimulus generate saccade-linked evoked responses whose amplitudes reflect the on vs off, left vs right, and size-of-eye-movement qualities of their particular eye movements. The results are consistent with the idea that evoked responses carry information. Some further implications of the model are discussed.

A69-80550

CORRESPONDENCE OF BRIGHTNESS ENHANCEMENT TO CORTICAL ALPHA RHYTHM

John L Kobrick and Richard L Cahoon (U S Army Res Inst of Environ Med, Natick Mass)

Perceptual and Motor Skills, vol 27 part 1 Dec 1968 p 751-756 16 refs

A test was conducted of Bartley's hypothesis that the dominant cortical alpha rhythm is the mediating mechanism for brightness enhancement phenomena. Alpha rhythm samples were obtained

periodically on 17 subjects while they adjusted the luminance of a steady light to match the apparent luminance of a flickering light presented in all combinations of 20 flicker frequencies ranging from 3.5 to 12 c.p.s. and three light-time fractions (LTFs). Correlation analysis of the alpha values paired with the flicker frequencies at which peak brightness settings occurred showed no significant relationships either in individual alpha-LTF comparisons or in the over-all correspondence of alpha to the brightness data. Thus, Bartley's hypothesis was not supported by the results of this study.

A69-80551

FIELD DEPENDENCE AS A PREDICTOR OF RESPONSES TO SENSORY AND SOCIAL ISOLATION

Marvin Zuckerman (Albert Einstein Med Center, Philadelphia Pa)

Perceptual and Motor Skills, vol 27, part 1, Dec 1968, p 757-758

Grant PHS MG-07926

Embedded-Figures-Test scores for 40 subjects in an eight hr isolation experiment were not specifically correlated with stress responses to sensory or social isolation but were correlated with responses to either type of isolation occurring on subject's first day at the laboratory. Familiarization with the laboratory on a preceding day reduced the correlations below significance.

A69-80552

ATTENTIONAL RESPONSE OF HUMANS AND SQUIRREL MONKEYS TO VISUAL PATTERNS: FINAL STUDIES AND RESUME

Larry T Brown and Lee P Gregory (Oklahoma State U, Stillwater)

Perceptual and Motor Skills, vol 27, part 1, Dec 1968, p 787-814 45 refs

Grant PHS MH-10350-02

A research program consisting of 10 experiments was conducted to determine (a) the nature of those physical properties of nonrepresentational visual patterns which are most likely to govern human viewing times and (b) whether dimensions found to correlate with human behavior bear similar relations to the attentional behavior of the squirrel monkey. The present paper reports the final three experiments of the series and presents an empirical and theoretical summary of the results of the program. It is concluded that human examination of nonrepresentational patterns is largely determined by both physical structure (especially contour extent) and amount of perceived information. It is also concluded that two dimensions found to govern human viewing (number and elevation of pattern components) have similar effects on the behavior of the squirrel monkey, and with regard to other dimensions that no statistically reliable evidence exists to suggest that any dimension affects the attentional behavior of one species in a manner contrary to that of the other species.

A69-80553

SUPPLEMENTARY VISUAL STIMULI AND ROTARY PURSUIT PERFORMANCE

Norman B Gordon (Yeshiva U, New York, N Y) and Alan Warner (Rockefeller U, New York, N Y)

Perceptual and Motor Skills, vol 27, part 1, Dec 1968, p 815-825 14 refs

Grant PHS MH-08087

The effect of supplementary visual stimuli on rotary pursuit (RP) performance was evaluated in two experiments. In Exp I a modified RP display presented target rotation within a visual guiding ring (VG) to one group of 15 subjects, and a standard

A69-80554

unguided RP display (UG) to another ($n = 45$ subjects) Subgroups of 15 subjects each were transferred from UG to VG after 20 trials (6.67 min of practice) and after 33 trials (11 min of practice) VG led to poorer performance after 33 trials at 60 r.p.m. Transfer from UG to VG led to loss in proficiency early transfer producing a three times greater proficiency loss Exp II was conducted with 120 subjects to determine whether the VG display possessed a distracting effect on a photoelectric RP task performance by 20 subjects each at 60, 70 and 80 r.p.m. and compared with performance by a like number of subjects on task UG The results confirm that VG produced poorer performance at 60 r.p.m. after 10 min of practice (30 20-sec trials) although early VG performance was superior VG was superior to UG performance at 70 and 80 r.p.m. over all trials It was concluded that visual stimuli which supplement the optical events of target motion can aid performance initially at 60 r.p.m. and for a longer period at more rapid rates of rotation but probably retard the development of learning this skill

A69-80554 PERFORMANCE DECREMENT AFTER INTAKE OF MEPROBAMATE AS A FUNCTION OF TASK DIFFICULTY AND LEARNING LEVEL

Marianne Frankenhaeuser and Anna-Lisa Myrsten (Stockholm U Psychol Labs Sweden)
Perceptual and Motor Skills vol 27 part 1 Dec 1968,
p 839-843 7 refs
Swed Med Res Council and Swed Council for Soc Sci Res supported research

The effect of 800 mg of meprobamate on performance in choice-reaction tasks of varying difficulty was examined Comparisons between scores obtained in drug and placebo conditions showed that performance was progressively more impaired by the drug as task difficulty increased and progressively less impaired as learning level increased

A69-80555 EFFECT OF STRESS ON SCANNING

Harvey E Hoffman (Temple U, Philadelphia Pa.)
Perceptual and Motor Skills, vol 27, part 1 Dec 1968
p 891-900 14 refs

The aim of this study was to elucidate the influence of stressful social stimuli on the operation of the scanning cognitive control principle The specific hypotheses to be tested were (a) that high-scanning subjects will intensify their scanning behavior as stress is increased and (b) that low-scanning subjects will reduce their scanning behavior as stress is increased An analysis of covariance design was used with pre- and post-measures of scanning and anxiety level as determined by a size-estimation test and the IPAT 8-Parallel-Form Anxiety Battery respectively Subjects were 108 male volunteers from introductory psychology courses Both hypotheses were supported by the data

A69-80556 PERCEPTION OF DEPTH IN ROTATING OBJECTS 5 PHENOMENAL MOTION IN STEREOKINESIS

Roy B Mefferd Jr (Veterans Admin Hosp, Psychiat and Psychosomat Res Lab and Baylor U Coll of Med Houston Tex)
Perceptual and Motor Skills vol 27 part 1 Dec 1968
p 903-926 46 refs

Stereokinetic motion percepts are described and analyzed The fluctuations of three visual systems, the near-far one

object-multiple object and anchor point mechanisms are shown to be independent, and the consequences of the fluctuations for phenomenal motion are examined The main current theoretical concepts of motion perception fail to account for all the observations reported Speculations on the function of the anchor point mechanism and on how motion data may be processed are advanced

A69-80557 EFFECTS OF EXPOSURE TO 12,800 FEET AND ACETAZOLAMIDE ON VISUAL PERFORMANCE

John L Kobrick (U.S. Army Res Inst of Environ Med Natick, Mass)
Perceptual and Motor Skills, vol 27, part 1 Dec 1968
p 939-944 33 refs

The combined effects of acetazolamide and hypoxia upon several types of visual performance at conditions of low and high illumination were investigated Two groups of 18 subjects each received either acetazolamide or placebo tablets and were tested on the same visual measures both at sea level and at a terrestrial elevation of 12,800 ft The results showed no statistically significant differences between visual performances at low and high elevations regardless of the illumination level Although acetazolamide combined with hypoxia did not generate any visual anomalies its effectiveness in reducing visual decrements produced by more severe hypoxia cannot be predicted from the data

A69-80558 INHIBITION AND THE FACILITATING EFFECT OF NOISE ON INTERFERENCE TASKS

B Kent Houston (Tex U Austin)
Perceptual and Motor Skills, vol 27, part 1, Dec 1968
p 947-950 13 refs
Grants PHS MH 15,757-03 and PHS HD 01092-01

Three groups of 14 college students performed the Digit Symbol Test (DST) and Embedded-figures Test (EFT) under one of three conditions: varied noises to be ignored, varied noises requiring attention for a spoken command and no noise It was hypothesized that performance on DST but not EFT, would be enhanced in the condition of noises to be ignored The results supported the hypothesis A case is made for explaining the findings in terms of an interaction between inhibitory processes

A69-80559 PERSONALITY TRAITS AS RELATED TO SYMPTOMATOLOGY AND RUNNING PERFORMANCE AT ALTITUDE UNDER NORMAL AND DRUG (ACETAZOLEAMIDE) CONDITIONS

Bernard J Fine (U.S. Army Res Inst of Environ Med Natick, Mass)
Perceptual and Motor Skills vol 27, part 1 Dec 1968
p 975-990 29 refs
Advan Res Proj Agency supported research

An individual-differences approach was brought to bear on data obtained from a large multi-disciplinary field study of the effects of altitude on a number of variables including running performance and illness symptomatology Personality-related effects of altitude on both performance and symptoms were obtained under placebo and drug (Acetazolumide) conditions In addition age and cigarette smoking were found to be positively related to decrements in running performance from sea level to altitude The findings supplement certain of the conclusions and generalizations produced by a groups-oriented approach in that the results suggest

that Acetazoleamide (1) may adversely affect running performance in some types of individuals (2) does not appear to reduce illness in some types of individuals and (3) that subjects for whom the drug appears to be effective in reducing the symptoms of illness appear to be among those in whom the drug induces a performance decrement

A69-80560

SERIAL POSITION EFFECTS IN DICHOTIC LISTENING

Wayne H Bartz (Iowa State U Iowa City)

Perceptual and Motor Skills, vol 27 part 1 Dec 1968 p 1014

Grant PHS MH 13192

Data from several experiments involving serial position effects of dichotic listening (DL) are reviewed In DL subjects recall pairs of verbal stimuli presented simultaneously to both ears At one pair/1/2 sec subjects tend to report items presented to one ear before those from the other Second-ear reports show lower recall than first-ear reports and errors in second-ear reports are correlated with time in store The decay hypothesis formulated by Broadbent was based on findings, from three-pair DL Investigations of this hypothesis using three and four pair DL are described The four-pair findings dictate a re-examination of the decay hypothesis and of theories accounting for DL findings

A69-80561

DEPTH LOCATION OF SHAFTS FILLING HALF THE SPACE BETWEEN MUELLER-LYER FINS

B G Stacey and A R Pike (Strathclyde, U Glasgow, Great Britain)

Perceptual and Motor Skills, vol 27, part 1, Dec 1968 p 1019-1022 7 refs

Using luminous stimuli in a dark room subjects were required to judge the apparent depth location of shafts filling half the space between the ingoing and outgoing fins of the Mueller-Lyer (M-L) illusion Under these conditions there is a reversal of the apparent depth location of the shafts as compared with the usual M-L illusion This finding is contrary to a prediction derived from the misapplied size-constancy theory but can be interpreted in terms of the size-distance principle

A69-80562

STUDIES ON THE ERYTHROPOIETIC EFFECTS OF HYPERBARIC HYPEROXIA

James W Linman (Mayo Clin and Mayo Graduate School of Med, Rochester, Minn) and Robert V Pierre (Veterans Admin Res Hosp and Northwestern U Med School Chicago Ill)

Annals of the New York Academy of Sciences, vol 149 Mar 29 1968, p 25-33 23 refs

Grants PHS AM-01991, PHS AM-10079 and PHS AM-0954

Normal mice exposed to a hyperbaric environment (four absolute atmospheres or 60 psia of air) exhibited erythropoietic depression manifested by a sharp curtailment in erythrocytic ^{59}Fe uptake reticulocytopenia and morphologic evidence of decreased erythropoiesis The erythropoietic effects of hyperbaric hyperoxia were in accord with the concept that tissue oxygen tension exerts homeostatic control over erythropoiesis It was suggested (but not proved) that this suppressive effect is transmitted to the marrow by the humoral regulatory mechanism Exogenous erythropoietin evoked a clear-cut increase in the incorporation of ^{59}Fe in hemoglobin of mice conditioned by breathing air under pressure However, certain adverse effects associated with residence in a hyperbaric chamber must be eliminated before hyperbarism can be

recommended as a completely acceptable method to prepare animals for erythropoietin assay

A69-80563

EFFECTS OF TESTOSTERONE, COBALT AND HYPOXIA ON ERYTHROPOIETIN PRODUCTION IN THE ISOLATED PERFUSED DOG KIDNEY

James W Fisher and J W Langston (Tenn U Med Units, Memphis)

Annals of the New York Academy of Sciences, vol 149, Mar 29 1968 p 75-87 23 refs

Grants PHS AM-02973 and PHS GM-5990

Isolated dog kidneys were perfused with blood at normal and reduced oxygen tensions and with blood containing testosterone or cobalt Erythropoietin titers were found to be significantly increased in the blood perfusates from kidneys perfused with blood at lowered oxygen tensions while no change in erythropoietin was seen when kidneys were perfused with blood at a normal oxygen tension Testosterone produced a slight increase in erythropoietin production in perfused kidneys from dogs pretreated for several days with testosterone before perfusion Cobalt produced significant increases in erythropoietin levels in the perfusates with normal as well as reduced oxygen tension blood, but its effect was more marked when the kidneys were perfused with hypoxic blood In studies of the histology of all kidneys perfused most of the kidneys demonstrated varying degrees of glomerular congestion No correlation was found between erythropoietin elaboration and renal congestion or other degenerative cellular changes in the kidney Therefore it is concluded that increased erythropoietin production in the isolated perfused kidney in response to cobalt, testosterone or hypoxic blood is a direct effect of these stimuli on the kidney rather than a release of erythropoietin from injured and disintegrating cells

A69-80564

STUDIES ON HYPOXIA 6 CHANGES IN LYMPHOCYTES AND TRANSITIONAL CELLS IN THE MARROW DURING THE INTENSIFICATION OF PRIMARY HYPOXIA AND REBOUND

J M Yoffey, R V Jeffreys, D G Osmond M S Turner S C Tahsin and P A R Niven (Bristol, U, Dept of Anat Great Britain)

Annals of the New York Academy of Sciences, vol 149 Mar 29, 1968, p 179-192 47 refs

The bone marrow of the guinea pig was investigated quantitatively both during primary hypoxia for seven days at a simulated altitude of 17,000 ft and for an additional seven days during the subsequent period of rebound (post-hypoxic polycythemia) During primary hypoxia the marrow not only showed evidence of increased erythropoiesis but also of a fall in granulocytes and lymphocytes During rebound, on the other hand erythropoiesis was depressed granulopoiesis returned to normal while lymphocytes and transitional cells showed a striking increase to well above their normal level The significance of these findings was discussed The marrow during rebound provided an admirable experimental model for the study of lymphocytes and transitional cells

A69-80565

THE EFFECT OF CARBON DIOXIDE ON ERYTHROPOIESIS

José Faura, Clifford W Gurney and Walter Fried (Chicago, U Depts of Med and Physiol and Argonne Cancer Res Hosp Chicago Ill)

Annals of the New York Academy of Sciences, vol 149, Mar 29 1968, p 456-461 11 refs

A69-80566

Grants PHS 1-F05-TW-922-01 and PHS F2-AM-20,919-01A1

High inspired carbon dioxide tension (PCO_2) suppressed the erythropoietic response to administration of gas mixture containing a low partial pressure of O_2 . It did so by decreasing the production of erythropoietin. Five percent CO_2 in the inspired air of anemic mice did not impair their ability to produce erythropoietin. It was suggested that high inspired PCO_2 suppressed erythropoietin production by inducing hyperventilation, thereby increasing HbO_2 saturation and the delivery of O_2 to the tissues.

A69-80568

HUMORAL REGULATION OF THE ERYTHROPOIETIC DEPRESSION OF HIGH ALTITUDE POLYCYTHEMIC SUBJECTS AFTER RETURN TO SEA LEVEL

César Reynafarje (Inst de Biol Andina Lima Perú)

Annals of the New York Academy of Sciences, vol 149 Mar 29 1968 p 472-474 6 refs

Grant DA-ARO-49-092-65-G90

Results were tabulated from investigations of the effects of high altitude on rats. Investigations included (1) the effect of plasma filtrate from high altitude natives after nine days at sea level, plasma from normal sea level subjects and saline in rats exposed to 18 000 ft, (2) a comparison of the effect of simple and concentrated plasma filtrate from altitude natives after nine days at sea level on stimulated rats, (3) the effects of total plasma from high altitude natives after 11 days of residence at sea level on rats exposed to 19,000 ft and (4) the effects of plasma filtrate from high altitude natives after 10 days at sea level plasma filtrate of sea level subjects and saline on hemoglobin of normal rats. The investigations indicated that an inhibitory humoral factor, as yet unidentified, exists in the plasma of high altitude natives brought down to sea level that is one of the regulatory mechanisms of erythropoietic activity.

A69-80567

THE EFFECT OF IMAGERY ON THE WAVESHAPE OF THE VISUAL EVOKED RESPONSE

R N Herrington and P Schneidau (N Y Med Coll Dept of Psychiat Brain Res Labs New York)

Experientia, vol 24 Nov 15 1968, p 1136-1137 5 refs

Grant NIMH MH 08579-03

Differences in waveshapes of the evoked visual response which occur in humans when various geometric shapes or words are inserted into the visual field during brief illumination also occurred in some subjects who attempted to imagine or hallucinate similar stimuli. In the experiment, the visual evoked response waveshape corresponded to what the subject was thinking and not to what stimulus was actually present in the visual field or whether the subject was or was not hallucinating.

A69-80568

THE EFFECT OF HALOPERIDOL ON THE SLEEP CYCLE OF THE CAT

J M Monti (School of Med, Dept of Pharmacol, Montevideo Uruguay)

Experientia, vol 24, Nov 15 1968, p 1143 5 refs

Fondo de Invest Cient de la U de la Rep (Uruguay) supported research

The effect of various doses of haloperidol on the rate of cyclic alternation of sleep phases and their electrophysiological manifestations in unanesthetized cats with indwelling electrodes in the brain was investigated. Calculations were made of (1) number of electrographic arousals, (2) total sleep time, (3) percentages

slow-wave sleep time, (4) percentage rapid eye movement (REM) sleep time, (5) latency of the first REM period, and (6) number of REM periods. It was concluded that haloperidol provokes a reduction of REM sleep time and an increase of slow-wave sleep time although it was not determined whether it exercises a potentiation of slow-wave sleep or a specific suppressive effect on REM sleep.

A69-80569

THE EFFECT OF RADIOPROTECTIVE SUBSTANCES ON THYMUS CELLS [ZUR WIRKUNG VON STRAHLENSCHUTZSTOFFEN AN THYMUSZELLEN]

Hildegard Braun (Freiburg i Br U, Radiol Inst West Germany)

Experientia vol 24 Nov 15 1968, p 1145-1146 17 refs
In German

Lymphocytes of the thymus can be protected against early pyknotic degeneration by several SH-compounds. Protective and non-protective SH-compounds induce the same reaction in the non-irradiated mouse weight loss caused by cell migration and stimulation of the reticulum. A direct relationship between the activity of the reticulum and the radio-resistance of lymphocytes was not found.

A69-80570

BIOLOGIC EFFECTS ON NON-IONIZING ELECTROMAGNETIC RADIATIONS

A W Richardson (Southern Ill U Carbondale)

Scientia, vol 103, no 677-678 1968 p 447-453

Over the past two decades thermogenic electromagnetic radiations, especially microwaves, have been revealed to have many biologic effects not known before. Some of these effects on the living organism are beneficial, some are pathogenic and some are lethal, depending greatly on the electromagnetic frequency and on the magnitude of field energy. Some exposures appear to be permissible magnitudes and some are not. Radar and other microwaves present a potential hazard to humans.

A69-80571

THE BIOLOGICAL SIGNIFICANCE OF ELECTRO-AEROSOLS

A P Wehner (Plano U Dept of Sci Tex)

Scientia, vol 103, no 677-678 1968, p 454-468 110 refs

Unipolar electric charges on aerosol particles result in better homogeneity and stability of the aerosol and in better penetration and deposition characteristics in the respiratory tract. In addition, there are certain biological effects, some of them with apparent therapeutic potential. An explanation of the differences between air ions and electroaerosols follows a discussion of technical and other problems in electroaerosology. The review, which is based on 110 references, concludes with the recommendation to include measurements of electric conditions of the atmosphere in the definition of weather and to further investigate the therapeutic potential of electro-aerosols.

A69-80572

THE METABOLIC COST OF MAINTAINING FIVE FIXED BODY POSITIONS

Rosemary T McCarthy (Walter Reed Army Inst of Res, Dept of Nursing Washington D C)

Nursing Research, vol 17 Nov-Dec 1968 p 539-544 35 refs

The metabolic cost of maintaining five fixed body positions was studied by the methods of open calorimetry in healthy female subjects aged 20 to 29 yr. Parameters obtained were oxygen

uptake heart rate minute ventilation vital capacity and respiratory rate From these values the metabolic cost in kilocalories per minute per kilogram of body weight per ten minutes per meter squared per minute, oxygen pulse and tidal volume were calculated No significant difference was found between any of these indices, except heart rate significantly higher in the sitting than in either the supine or in the left lateral posture, and minute ventilation significantly higher in sitting than in the supine or right lateral positions For the subjects studied the metabolic cost of maintaining any one of the five positions did not significantly differ from that of any other Within the limitations of the study one would say that the clinical use of nonuse of any of these positions would not be governed by the metabolic cost The energy requirement for the position would not be a factor in deciding to use the position and the selection of a particular posture would depend upon other factors in the patient's condition

A69-80573

CONTRIBUTION TO THE METHOD OF LOCAL BLOOD FLOW DETERMINATION IN RATS BY MEANS OF $Rb\ 86$

J Kapitola, O Schreiberová, and I Jahoda (Charles U., Fac of Med Lab of Endocrinol and Metab Prague Czechoslovakia)
Nuclear-Medizin, vol 7 Oct 31 1968 p 279-285 8 refs

The study describes some experience with the determination of local organ blood flow by measuring tissue uptake of Rb in conscious rats The values of ^{86}Rb uptake in 16 organs and tissues of intact rats, results of control measurements in animals sacrificed 20, 40 and 60 sec after ^{86}Rb injection and some local variations in the same organ or tissue, are presented Some hazards exist when measurement of ^{86}Rb uptake is used for indirect determinations of blood flow, but the method has indisputable advantages as compared to other techniques of blood flow determinations, especially in the extraordinary wide scope of utilization

A69-80574

BEHAVIOR OF MUSCULAR STRENGTH DURING PHYSICAL EXERTION AT HIGH ALTITUDE [DAS VERHALTEN DER MUSKELKRAFT BEI KÖRPERLICHER ANSTRENGUNG IN GROSSE HOHE]

H Eigelsreiter and S Beitelmayr (U Innsbruck, Inst für Physiol Austria)
Zeitschrift für Biologie, vol 116 Oct 1968, p 81-85 6 refs In German

The behavior of muscular strength during a stay at 2,800 m and subsequent physical exertion while ascending to a higher altitude (ceiling ascent up to 4,600 m) was tested with a hand dynamometer For the ceiling ascent there was a distinct increase in muscular strength for the morning values in almost all subjects All values (morning mid-day and evening) respectively, on the days without ceiling ascent (stay at 2,800 m) showed on the average only a slight elevation as compared with the starting values (mean values of several investigations during two days in Innsbruck)

A69-80575

THE EFFECT OF CARBON DIOXIDE ON THE BLOOD FLOW AND AUTOREGULATION OF THE KIDNEY [DIE WIRKUNG VON KOHLENSÄURE AUF DIE DURCHBLUTUNG UND AUTOREGULATION DER NIERE]

H Kirchheim, V Thamer and H Baubkus (U Heidelberg, I Physiol Inst, West Germany)
Zeitschrift für Biologie, vol 116 Oct 1968 p 129-142 68 refs In German

Deut Forschungsgemeinschaft supported research

Renal blood flow, arterial blood pressure pH pCO_2 and pO_2 in

arterial blood were recorded continuously in anesthetized dogs Room air mixed with 10% CO_2 was administered during constant artificial respiration Renal blood flow was measured with an electromagnetic flowmeter Mean arterial blood pressure was kept constant by a clamping technique developed for use in shock experiments Under both hypotensive and normotensive pressures in 42 out of 75 experiments CO_2 reduced renal vascular resistance, in 20 experiments renal vascular resistance was increased whereas in 13 cases no effect was observed The vasoconstrictor responses were associated with a significantly higher renal vascular resistance during the control period The vasodilator response to carbon dioxide in the course of stepwise bleeding and reinfusion was clearly pressure-dependant and suggested abolition of renal autoregulation Reduction of renal blood flow by an intravenous infusion of norepinephrine or angiotensine II prior to the administration of CO_2 in 15 out of 19 experiments had no influence on the observed response that is, the vasoconstrictor effects of these drugs were partly abolished It is concluded that carbon dioxide effectively reduces renal vascular resistance provided control flows are sufficiently high During low control flows most probably caused by reflex sympathetic activation carbon dioxide leads to a further increase of renal vascular resistance

A69-80576

LAG OF SOUND LOCALIZATION IN THE HORIZONTAL PLANE [EIN BEITRAG ZUR TRAGHEIT DES RICHTUNGSHÖRSENS IN DER HORIZONTALBENE]

J Blauert (Rheinisch-Westfälischen Tech Hochschule Inst für Elek Nachrichtentech Aachen, West Germany)
Acustica vol 20 no 4 1968, p 200-206 12 refs In German

With fixed head subjects were exposed to sequences of sound pulses in an anechoic chamber The direction of the pulses changed always after equal intervals from left to right or front to rear The pulse rate was raised until the direction of the sound as experienced by the subjects no longer alternated between the directions of the sources Thus an average value of the threshold for perceiving a reversal of direction was obtained Among other things the results suggested that front-rear and lateral sound localization with fixed position of the head is based on different physiological processes

A69-80577

AUDITORY SENSATION PRODUCED BY AMPLITUDE MODULATED TONES [ÜBER DIE DURCH AMPLITUDENMODULIERTE SINUSTONE HERVORGERUFENE HÖREMPFINDUNG]

E Terhardt (Tech Hochschule, Inst für Elektroakustik, Munich West Germany)

Acustica vol 20 no 4 1968 p 210-214 11 refs In German

If the human ear is exposed to amplitude modulated tones various regions of modulation and carrier frequency can be distinguished with respect to the produced auditory sensation The modulation frequencies separating these regions are determined as a function of the carrier frequency They are compared with some results obtained by other workers

A69-80578

ACOUSTIC ROUGHNESS AND FLUCTUATION STRENGTH [ÜBER AKUSTISCHE RAUHIGKEIT UND SCHWANKUNGSSTARKE]

E Terhardt (Tech Hochschule, Inst für Elektroakustik Munich West Germany)

Acustica, vol 20, no 4 1968, p 215-224 7 refs In German

Deut Forschungsgemeinschaft supported research

A69-80579

Measurements were carried out with four subjects to determine the laws describing the dependence of the perceived acoustic roughness and fluctuation strength on the parameters of an amplitude modulated pure tone (modulation factor, level, modulation and carrier frequency). It is shown that fluctuation strength and roughness are proportional to the square of the modulation factor and double for any 20 db increase in level. Furthermore the influence of modulation and carrier frequency yield interesting indications as to the frequency selection in the inner ear and the inertia of the auditory perception of temporally fluctuating stimuli.

A69-80579

VISION RESEARCH IN GOVERNMENT LABORATORIES

John Lott Brown (Kan. State U., Manhattan)

Survey of Ophthalmology, vol 13, Nov 1968, p 164-168 20 refs

Research on vision conducted in laboratories of the Air Force, the Army, the Navy, the Coast Guard, and the National Aeronautics and Space Administration is summarized. The following is included: (1) visual problems associated with military operations; (2) problems associated with special environments; (3) optical aids; (4) applied research including search, detection, recognition and reconnaissance, information displays, night vision, flash blindness, visually guided continuous control functions, space flight and longitudinal studies; (5) basic visual research; and (6) standards testing and screening.

A69-80580

USE OF DRUGS IN THE EYE

Philip P. Ellis (Colo., U., Med. Center, Denver)

American Family Physician, vol 15, Nov 1968, p 69-78

Topical agents are generally effective in diseases of the anterior segment of the eye. Systemic drugs are usually employed for diseases of the orbit and posterior segment. In some situations combined use is required. Antibiotics penetrate the eye poorly when applied topically. Topical use of antimetabolites has been successful in treating herpes simplex and vaccinia infections of the eye. Corticosteroids, used topically or systemically, may induce glaucoma and produce lens opacities. Occasionally, topically applied drugs may produce systemic effects.

A69-80581

THE CHANGE OF THE MYOCARDIUM UNDER CRANIOCEREBRAL HYPOTHERMIA [IZMENENIE MIOKARDA PRI KRANIO-TSEREBRAL'NOI GIPOTERMII]

Sh. D. Penner (Vladimir Pedagogical Inst., USSR)

Biologicheskii Nauki, no 7, 1968, p 47-49 9 refs. In Russian

Craniocerebral hypothermia was induced in 18 narcotized and thoracotomized dogs. The animals were cooled to 26°C. The variations of the left ventricle diameter and of the myocardium thickness were studied during the different phases of the cardiac cycle. Recordings of these parameters showed that cooling of the brain produced a 15% increase in the left ventricle diameter and decreased the cardiac wall thickness by 36% during the systole and by 38% during the diastole. Simultaneously during the early stages of the cooling the systolic amplitude changed. However with the deepening of hypothermia the difference between the systolic and diastolic dimensions of the left ventricle was reduced. The changes observed were correlated to the mechanical properties of the cardiac muscle such as elasticity, contractility, plasticity and thermal resilience. In accordance with the thermodynamic laws with the drop in temperature and decrease of the endogenous energy

of muscle fibers, an increase in length occurred. The lengthening of the muscular fibers observed during hypothermia facilitated the contractility of the cooled myocardium. This produced an increase in the heart work capacity during low temperature, and was expressed in the work increase performed by the heart during a single systole.

A69-80582

THE EFFECT OF IONIZING RADIATION ON THE SEROTONIN CONTENT IN RAT TISSUES [VLIYANIE IONIZIRUIUSHCHEI RADIATSSII NA SODERZHANIE SEROTONINA V TKANIAKH KRYSA]

E. N. Goncharenko, S. M. Subbotina and L. I. Aleeva (M. V. Lomonosov Moscow State U., USSR)

Biologicheskii Nauki, no 7, 1968, p 61-65 12 refs. In Russian

The data obtained in this study showed definite changes in the serotonin content in the rat tissues during the development of acute radiation sickness induced by exposure to doses of 1000 r of gamma-radiation. Phase changes, increases of short duration during the early period of sickness and steady decrease during the following period were observed in the gastrointestinal tract and liver. In the brain tissues the serotonin content remained enhanced during the whole experimental period. It was determined that in the early period of the sickness the increase in serotonin content came from the active free serotonin. Taking into account high serotonin activity and wide physiological action range, it could be assumed that even a short period of accumulation of small serotonin concentrations could produce definite changes in the physiological and biochemical functions of the organism. The decrease in the normal level of serotonin in the terminal period of the sickness could also induce pathological changes in the organism.

A69-80583

A PREDICTIVE SCALE OF AIRCRAFT EMERGENCIES

Lynn V. Rigby and David A. Edelman (Sandia Lab., Reliability Dept., Albuquerque, N. Mex.)

Human Factors, vol 10, Oct 1968, p 475-482 14 refs

AEC supported research

In the quantification of human performance, the effects of stress can be dealt with objectively only if one first determines the relative stress-producing value of different conditions within the given operational environment. This paper presents a paired comparison scale of 32 common aircraft emergencies judged by 27 former pilots and aircrew members. The scale is intended primarily for use in human error analysis. A new emergency can be incorporated by matching it to one or more points on the scale, or the scale can be transformed to satisfy any new interpretation of the relationship between emergencies and stress.

A69-80584

LEISURE AND RECREATION IN LONG DURATION SPACE MISSIONS

T. M. Fraser (Waterloo, U., Ontario, Canada)

Human Factors, vol 10, Oct 1968, p 483-488 12 refs

NASA Contract NASr-115

Leisure activities pursued during long range space missions should not be considered by planners as merely a way of filling in time. Current astronaut selection procedure tends to favor those who in leisure time in spacecraft will spontaneously pursue mission-oriented activities, making the most of whatever facilities are available. With provision of an appropriate climate and opportunity, encouragement can be given to furtherance of the creative use of leisure for self-development of the persons involved. Provision

should be made for both active recreation, as in hobbies communal games and even music making and for passive enjoyment as in listening to recorded music and radio watching television and movies, and reading. Provision for exercise programs is also required.

A69-80585

EFFECTIVENESS OF FILTERS IN IMPROVING AIR-TO-GROUND TARGET IDENTIFICATION PERFORMANCE ON A TELEVISION DISPLAY

Dorothy M Johnston (North Am Rockwell Corp Columbus Ohio)
Human Factors, vol 10 Oct 1968 p 489-492

The purpose of this study was to determine if the utilization of filters would improve target identification performance on a television display. Inflight video tape was obtained of convoys of vehicular targets under different meteorological visibility conditions while using two types of filters and a no-filter condition on the television camera. The video tape was used in the laboratory for dynamic presentations on a television display. Analysis of variance revealed with five mi visibility no reliable difference in target identification slant ranges between filters 15 and 29 but reliable differences between filter 15 and no filter and between filter 29 and no filter. With seven mi meteorological visibility reliable differences in target identification performance were found between all combinations of the conditions investigated. Maximum mean improvements in performance were as follows: with five mi visibility filter 15 increased target identification range 2 600 ft farther than the no-filter condition. With seven mi visibility filter 29 increased target identification range 3.685 ft farther than the no-filter condition.

A69-80586

AN EXPERIMENTAL COMPARISON OF TWO MAP DISPLAY MODES

Richard S Laymon (System Develop Corp, Advan Systems Div Falls Church, Va)

Human Factors, vol 10 Oct 1968 p 497-503
Contract DA 49-092-ARO-65

A comparison was made of two methods of displaying map information to image interpreters in a tactical image interpretation context. While viewing each display interpreters located the boundary of an aerial photograph and then estimated the map coordinates of a designated object on the same photograph. Time taken to achieve correct solutions was compared when map information was displayed on simulated projected maps (map sections were posted against a fixed screen) and on standard map sheets. The latter mode was structured so that adjoining maps were always combined when the photographic area covered two adjoining maps. The map-photograph viewing relationship was varied in two ways: one in which the position of the photograph was fixed and one in which the photograph could be freely oriented to the map display. The following conclusions were derived: (1) Simulated projected maps increase the time an interpreter takes to find a photograph's area and to determine map coordinates of an object on the photograph; the longer time is attributable to the need to view successively two projected maps when the photographic area lies near the boundary of a projected map. (2) Freedom to orient a photograph relative to a map display does not shorten the time taken to find the photographic area on a map or to determine map coordinates of a designated object on the photograph.

A69-80587

ATTENUATION OF THE VIGILANCE DECREMENT THROUGH STIMULATION IN A SECOND MODALITY

Josephine M Randel (Fordham U Bronx N Y)

Human Factors, vol 10 Oct 1968, p 505-511 18 refs

The use of discrete randomly-placed tones to attenuate a decrement in performance in a visual vigilance task was studied. As the measure of vigilance, the descending critical flicker fusion threshold was taken at 15 time intervals throughout the hour watch. Sixty male subjects were assigned to one of the six conditions of the experiment. A regular or irregular pattern of intervals for the presentation of the visual stimuli was combined with one of three sound conditions: (1) a ready signal in the form of a 1,000 c.p.s. tone lasting one sec and indicating the start of a visual signal, (2) tones of the same dimensions randomly placed and not indicating the presence of a visual signal and (3) no tones. The results indicated optimum performance for condition (1) with conditions (2) and (3) following in that order and confirming that the vigilance decrement can be attenuated to a significant degree when random auditory stimulation is provided. No significant difference was found between the two types of visual patterns.

A69-80588

THE EFFECTS OF STEREOSCOPY ON THE RECOGNITION OF PATTERNS IN VISUAL NOISE

Henry Giarretto (Lockheed Missiles and Space Co Sunnyvale Calif)

Human Factors, vol 10, Oct 1968 p 513-521 22 refs

This paper reports the results of a study to determine if noisy visual patterns containing binocular disparity cues could be recognized more accurately than similar patterns with no disparity cues. To obtain a quantitative measure of this visual task three-dimensional patterns were employed based on the metric figures technique developed by Fitts and his colleagues. The test results indicated as expected that the ability to recognize visual patterns in noise degraded as the noise level was increased. However, discrimination ability measured with figures containing binocular disparity cues degraded at a significantly lower rate ($p < .01$) than with figures without disparity cues.

A69-80589

DETECTION TIME TO A POINT SOURCE OF LIGHT APPEARING ON A STAR FIELD BACKGROUND WITH AND WITHOUT A GLARE SOURCE PRESENT

Richard F Haines (Mich State U, East Lansing)

Human Factors, vol 10 Oct 1968 p 523-529 30 refs
Grant NIH 1F1-MH-16 907-01A1

One hundred and twenty-seven untrained observers were tested in a planetarium in order to determine how long it takes to detect the onset of a point source of light appearing at different locations within a star field with and without a veiling glare source present. Results indicated that detection time was shortest when test spots were flashed in a totally dark visual environment. Introduction of a simulated star field produced significantly longer detection times as did the introduction of a star field and glare source. These results are related to findings from previous investigations as well as to certain sighting situations performed in the aerospace environment.

A69-80590

REVERSIBILITY OF THE STRUCTURAL CHANGES IN CHLORELLA PYRENOIDOSA 82 CELLS, INDUCED BY NITROGEN DEFICIENCY [OBRATIMOST' IZMENENII STRUKTURY KLETKI CHLORELLA PYRENOIDOSA 82, VYZVANNYKH AZOTNYM GOLODANIEM]

G L Kliachko-Gurvich, N I Raikov, and A P Raikova (USSR Acad of Sci K A Timirязev Inst of Plant Physiol Moscow)

Fiziologiya Rastenii, vol 15, Sep-Oct 1968 p 831-835 29 refs
In Russian

A69-80591

Chlorella pyrenoidosa 82 cells grown in nitrogen-free media formed osmiophilic globules in which the lipids synthesized under these conditions were apparently concentrated. Usually two or three large globules could be discerned in the cell; they occupied most of the cell volume and forced the chloroplasts toward the cell wall. Small globules could be observed between the chloroplast lamellae. When nitrogen was introduced into the culture the osmiophilic globules became smaller and finally disappeared; the cell structure was restored and the cells started to divide.

A69-80591

THE GROWTH AND CHEMICAL COMPOSITION OF CHLORELLA PYRENOIDOSA IN THE ABSENCE OF NITROGEN [ROST I KHIMICHESKII SOSTAV CHLORELLA PYRENOIDOSA V OTSUTSTVIE AZOTA]

N V Trukhin (USSR, Acad. of Sci. Inst. of Biol. of Inland Waters, Yaroslavl)

Fiziologiya Rastenii, vol. 15, Sep–Oct 1968, p. 836–843, 15 refs. In Russian.

Algae containing up to 10.2% of total nitrogen were grown for four days in a Tamiya solution without mineral nitrogen. The photosynthesis and respiration rates, the increase of biomass, the content of carbohydrates, fresh fats, fatty acids, pigments and total nitrogen were determined systematically. The algae photosynthesized and increased their biomass over a long period of time; the rates during the first few days being as high as those in algae grown in the presence of nitrogen. After four days the photosynthesis and the increase of biomass ceased. The total amount of nitrogen in the algae culture remained the same over a long period of time, but decreased by 10% between the second and fourth day of the experiment. The carbohydrate and fatty acid content increased continuously during the first two days, subsequently the carbohydrate content decreased slightly and the fatty acid content increased. The fresh fat content decreased continuously. On the fourth day the lipid fraction was mainly composed of fatty acids. It was concluded that the most pronounced changes in the chemical composition of algae transferred from a nitrogen-containing medium to a nitrogen-free medium occurred during the initial period when the rate of photosynthesis was still high.

A69-80592

INFLUENCE OF HYPOXIA ON THE FIRST STAGE OF BLOOD COAGULATION BASED ON

THROMBOELASTOGRAPHIC DATA [VLIYANIE GIPOKSII NA Pervuiu fazu svertyvaniia krovi po dannym trombelastografii]

E F Lunets, Ch V Pristupa, P N Karpovich and A I Komiak
Vestsi Akademii Navuk Belaruskai SSR, no. 3, 1968, p. 117–120, 8 refs. In Russian.

Experiments were carried out on rabbits to study the effect of hypoxia of different duration on the time blood coagulation in the first stage. The findings showed no effect on the clotting properties of the blood after five min. of hypoxia. After a ten min. exposure a decrease in the blood coagulation time was observed, due to an increase of the activity of the plasma clotting factors. Exposures of 15 to 20 min. caused a reduced blood coagulability subsequent to a slow formation of thromboplastin. After 25 min. of hypoxia the blood coagulation time was sharply reduced along with a marked increase of blood coagulability during the first stage due to a high activity of the blood plasma clotting factors.

A69-80593

REACTIVE CHANGES OF THE CELLULAR ELEMENTS OF THE LOOSE CONNECTIVE TISSUES AND OF THE

HEMOPOIETIC ORGANS INDUCED BY BENZENE [REAKTIVNYE IZMENENIYA KLETOCHNYKH ELEMENTOV RYKHLOI SOEDINITEL'NOI TKANI I ORGANOV KROVETVORENIIA POD VLIYANIEM BENZOLA]

L V Melikhina (S M Kirov Mil.-Med. Acad. Dept. of Histol. and Embryol., Leningrad)

Arkiv Anatomii, Gistologii i Embriologii, vol. 55, no. 9, 1968, p. 47–55, 9 refs. In Russian.

A brief morphological characteristic of the cellular elements of the loose connective tissue, their quantitative relationship, as well as some data concerning nucleocytoplasmic ratio in fibroblasts, histiocytes and leucocytes was presented. The problem of DNA localization in the nuclei of the connective tissue cells was also discussed. Subcutaneous administration of benzene to rats produced a reaction in the cell elements within 10 to 15 min. Fibroblasts, decreasing in their dimensions, were separated from the main substance; the amount of cytoplasm grew in the histiocytes and lymphocytes. These changes led to the formation of a morphologically uniform group. Within 45 min. extravasation and escape of a large number of leucocytes from the vessels were observed. Within one to three hr. an intensive decomposition of the cells, with resulting activation of the elements of the macrophage system in the neighboring tissues, was noted. In the experiments lasting for 16 to 18 hr. the macrophages represented a majority of the cells and actively phagocytized the decomposition products. By the end of 24 hr. the elements of the lymphoid row migrated from the blood vessels. They showed intensive amitotic division and differentiation directed to the formation of fibroblasts, macrophages and cells of the granulocyte type. In the experiments where benzene was administered by inhalation the animals were maintained in an airtight chamber during 20 days; the concentration of benzene vapor was 12 mg/m³. The study of the connective tissue showed degenerative alterations in many cell elements, for this reason their total number was diminished by the end of the experiment. Granulocytes suffered the greatest changes. Non-differentiated blood cells appeared in the perivascular zones. A study of the hemopoietic organs in the animals subjected to benzene inhalation showed a reduced number of mature cell forms in the bone marrow; the process of cell ripening was slowed. In the spleen and lymphatic nodes the lymphoid tissue disappeared; plasmocellular reaction was very marked.

A69-80594

ATYPICAL MITOSES IN THE RAT LIVER IN CARBON TETRACHLORIDE POISONING [ATIPICHESKIE MITOZY V PECHENI KRYSA PRI OTRAVLENII CHETYREKHKHLORISTYM UGLERODOM]

V K Verin (Kalinin Med. Inst. Dept. of Histol. and Embryol. USSR)

Arkiv Anatomii, Gistologii i Embriologii, vol. 55, no. 9, 1968, p. 63–66, 8 refs. In Russian.

In rats exposed to prolonged carbon tetrachloride poisoning the pathologic mitoses in the liver increased with the gradual impairment of the general structure of the organ, attaining a maximum on the ninth month (1.73 ± 0.43%). Grave forms of atypical cell division, such as dispersion of chromosomes, fragmentation, monocentric and multipolar mitoses, were noted. The hepatic cells, dividing by means of atypical mitosis, exhibited a number of histochemical characteristics, testifying to an essential functional difference between pathological and normal karyokinesis. The fate of the cells with atypical mitosis was determined by the seriousness of the chromosomal injury and by the cytoplasmic state.

A69-80595

THE MORNING RECALL OF RAPID EYE MOVEMENT PERIOD REPORTS GIVEN EARLIER IN THE NIGHT

Frederick Baekeland and Richard Lasky (N Y State U, Downstate Med Center Dept of Psychiat, Brooklyn)

Journal of Nervous and Mental Disease, vol 147, Dec 1968 p 570-579 41 refs

Grants PHS MH-23,901 PHS MH-03885 and PHS MH-628

At least three and in most cases, not more than four, rapid eye movement period (REMP) reports were obtained from 20 male subjects, all of whom had at least four awakenings immediately after their terminal morning awakening and report they were asked, without any prior set to do so to recall in as much detail as they could the reports they had given during the night. Eleven subjects failed to recall at least one of the first three reports while 22/60 reports were completely forgotten. Studied were the effects of the following variables on recall of the first three reports: cognitive style, rapid eye movement (REM) density, awakening reaction times, times spent awake from awakenings, report length, report affect scores and repression. Field dependence and lower REM densities favored forgetting, as did higher reaction times, shorter times spent awake and shorter reports. Cognitive style and REM density were interrelated, as were reaction times, time spent awake and report length. However, the last three factors were independent of the first two. Affect scores were not significantly related to delayed recall. A clinician judge who used the subjects' original dream reports, personality data on them and criteria involving consideration of factors facilitating repression was able to predict ease of recall better than chance only in the case of the third report. The finding that recallers tended to be field-independent and non-recallers field-dependent agrees with the results of published studies of home dream recall. The fact that 63.3% of the reports subjects gave were subsequently recalled either completely or in part is consistent with the notion that spontaneous awakenings from REMPs may contribute to morning dream reports given under home conditions.

A69-80596

VISUAL INTENSITY JUDGMENTS: AN EMPIRICAL RULE AND A THEORY

Richard M. Warren (Wis U Milwaukee)

Psychological Review, vol 76 Jan 1969, p 16-30 66 refs

Grant NIH NB 05998 and Wis U supported research

Judgments of visual intensity are shown to be proportional to the square root of the stimulus intensity when known biasing factors are eliminated for five classes of judgments: (a) lightness of gray papers, (b) brightness of luminous fields, (c) brightness of brief light flashes, (d) brightness of star points, and (e) quantitative judgments of color. An explanation of this rule is offered in terms of the physical correlate theory of sensory intensity.

A69-80597

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS' PROPOSED THRESHOLD LIMIT VALUE FOR NOISE

Herbert H. Jones (Am Conf of Govt Ind Hyg, Phys Agents Comm, Cincinnati, Ohio)

American Industrial Hygiene Association Journal, vol 29, Nov-Dec 1968 p 537-540 20 refs

The American Conference of Governmental Industrial Hygienists has proposed a threshold limit value for noise. The limit for broad band noise would be 92 decibels as measured on the A-scale of a sound level meter (dBA), for exposure of four to eight hr/day, 97 dBA for two to four hr, 102 dBA for one to two hr, and 107

dBA for less than one hr. The limit for narrow bands of noise or pure tones would be five decibels lower than that for broad band noise. A limit of 140 decibels peak sound-pressure level for impulsive or impact noise is recommended.

A69-80598

THE DETERMINATION OF A SENSORY RESPONSE TO ALKYL 2-CYANOACRYLATE VAPOR IN AIR

W. A. McGee, F. L. Oglesby, R. L. Raleigh (Tenn Eastman Co Kingsport), and D. W. Fassett (Eastman Kodak Co, Rochester N Y)

American Industrial Hygiene Association Journal, vol 29 Nov-Dec 1968 p 558-561 5 refs

Certain alkyl 2-cyanoacrylate monomers have attained wide usage as adhesives in industrial, defense, and aerospace applications and investigations are in progress to assess their value in surgical applications. To evaluate personnel exposure and to correlate odor thresholds and sensory reactions, the following method of analysis was devised. The monomer or polymer was collected in 0.5N sodium hydroxide with the liberation of formaldehyde which is determined by use of the chromotropic acid reagent. A simulated workbench exposure was created within an exposure chamber with volunteer subjects performing operations so graduated as to produce vapor levels ranging from 1 ppm to 60 ppm. Sensory responses to these concentrations were recorded and are presented. Conclusions regarding desirable working procedures and limits of vapor concentrations are presented.

A69-80599

POST-THYMECTOMY WASTING DISEASE AND INTESTINAL BACTERIAL FLORA

Joseph D. Sherman and Mildred Turner (Framingham Union Hosp Dept of Hematol Mass)

Archives of Pathology, vol 87, Jan 1969, p 29-34 28 refs

Grant PHS 5 RO 1 AM 08014

Post-thymectomy wasting disease was studied in the AL strain hamster and an attempt was made to relate the wasting disease to the intestinal bacterial flora. Wasted animals did not have increased numbers of intestinal bacteria. It was not possible to relate wasting disease to a particular intestinal organism. Wasting was completely prevented by succinylsulfathiazole (Sulfasuxidine) and sulfaguanidine but it was not prevented by tetracycline. Neomycin was partially effective in preventing wasting disease. All wasted hamsters had the usual bacterial flora (both qualitatively and quantitatively) and absolute lymphocytopenia. Wasting was not consistently related to abnormalities of γ -globulin or to intestinal crypt lesions.

A69-80600

VESTIBULAR PHYSIOLOGY AND TESTS

L. B. W. Jongkees (Amsterdam U, Dept of Oto-Rhino-Laryngol, The Netherlands)

Archives of Otolaryngology, vol 89 Jan 1969 p 37-44

Third Workshop on Microsurg of the Ear, Chicago, Mar 27, 1967

Vestibular physiology and associated tests are discussed. Many tests of vestibular function can be easily performed by any doctor at home: the examination of walking, standing, pointing and spontaneous nystagmus. Others need more or less complicated apparatus such as caloric, rotatory and galvanic tests, parallel and torsion swings, electronystagmography, etc. Many of these more complicated tests not only give us information about the pathological reactions of the labyrinth, but can also be used for research into the normal function of this sense organ and its parts.

A69-80601

A69-80601

Thermal Testing of the Vestibular Labyrinth

Brian F McCabe (Iowa U, Coll of Med, Dept of Otolaryngol and Maxillofacial Surg, Iowa City)

Archives of Otolaryngology, vol 89 Jan 1969 p 48-50 *Third Workshop on Microsurg of the Ear, Chicago, Mar 27, 1967*

A critical analysis is given of the use of the caloric test in vestibular examination. It is stressed that this method is only an aid in diagnosis and a complete examination of the patient must be made. Modifications of the caloric test including those using electronystagmography are included.

A69-80602

An Evaluation of Vestibular Testing

W J McNally (McGill U Inst of Otolaryngol and Roy Victoria Hosp Montreal, Canada)

Archives of Otolaryngology, vol 89 Jan 1969 p 57-63 8 refs *Third Workshop on Microsurg of the Ear, Chicago, Mar 27, 1967*

It is important to stress the importance of simplicity of the vestibular examination for the clinician. This is especially germane because in the past the examination of the vestibular part of the internal ear has been postponed indefinitely because of the undue stress which was put upon the complexity of the test techniques and upon the difficulties in their interpretation. It is hoped that one result of this conference would be a realization by each and every clinician present that it is well within the potentialities of his office examination to obtain a fairly reliable estimate of the state of the vestibular mechanism. At the conclusion of careful history taking a search for spontaneous phenomena a physical examination, and simple vestibular tests the physician knows whether there are any symptoms or signs which are alarming such as the story of a true loss of consciousness with the dizziness severe and persistent headache seizures of the limbs complaints of numbness paralysis or involvement of any of the cranial nerves other than the eighth nerve. A canal paresis or diminished labyrinthine reaction can be due to either a peripheral or central lesion. A true hyperexcitability of the labyrinth rarely follows peripheral disease and is usually due to a central cause. A positional nystagmus is an objective sign of an organic lesion somewhere in the vestibular system, but its localizing value has not been established. A directional preponderance is present in about 20% of normal individuals. Its lateralizing or localizing value has not been established. The important point is that a canal paresis or a positional nystagmus or possibly a directional preponderance are objective signs of abnormality within the vestibular system either peripheral or central, and call for a complete vestibular examination including nystagmography if it is available. What is more important however is that they indicate that a thorough investigation of the cardiovascular and central nervous systems is absolutely imperative before any form of treatment is undertaken.

A69-80603

Effect of Preceding and Concurrent Stimulus Conditions on the Pleasantness of Auditory Stimulus Sequences

Karl Wender (Tech Hochschule Inst fur Psychol Darmstadt West Germany) Paul B Baltes, and Gisela Labouvie (W Va U, Morgantown)

Psychonomic Science, vol 13 Nov 15 1968 p 73-74 7 refs

A total of 72 adult male subjects judged the pleasantness of eight auditory stimulus sequences differing in the number and rate of succession of single tone elements within a 10 sec interval (3, 5, 8, 13, 22, 37, 61, 100). The effects of differential preceding stimulation, concurrent stimulation and succession rate were

evaluated by an analysis of variance design. A strong main effect of succession rate was obtained. Supplemental analyses suggested that a slight effect of concurrent stimulation diminished during the relatively long period of the rating procedure. The results argue for a rather stable optimal level of pleasantness for auditory sequences in the range of 3-13 stimuli per 10 sec interval.

A69-80604

The Perception of Rotation with an Oscillating Trapezoid

Robert Zenhausern (St John's U Jamaica, N Y)

Psychonomic Science, vol 13 Nov 15 1968, p 79-80 8 refs

The existence of a new perceptual illusion, the perception of rotation under conditions of veridical oscillation has been demonstrated. This illusion was compared to the Ames phenomenon (the perception of oscillation under conditions of veridical rotation) in terms of the parameters of distance and replication.

A69-80605

Clarity and Recognition of Masked and Degraded Stimuli

Ralph Norman Haber and Lionel Standing (Rochester U N Y)

Psychonomic Science, vol 13 Nov 15 1968, p 83-84 9 refs

Grants PHS MH 10753 and NSF GB 5910

Three subjects viewed arrays of four letters which were either varied in duration or followed by visual noise. On half of the trials they rated the clarity of the letters; on the other half they attempted to recognize all of the letters. The results showed that while both clarity and recognition increased in parallel as duration was increased, clarity exceeded recognition accuracy when visual noise followed the array. Thus, subjects said the letters were clear even though they did not have enough time to process them for recognition. These results were interpreted as supporting an information processing model of the effects of visual noise, as compared to a sensory or temporal summation explanation.

A69-80606

Transfer Effects in Adaptation to Prismatic Displacement

Elizabeth Van Laer (CUNY City Coll, New York, N Y)

Psychonomic Science, vol 13, Nov 15, 1968, p 85-86

Contract DA DA 17-68-C-8065

Twenty subjects wore a 20 diopter displacement prism while they practiced tracking a moving target and when they performed a second task requiring location of a stationary target. Results showed significant transfer of adaptation effects to performance on the second task and showed a limited aftereffect upon removal of the prism. Massed and distributed practice on the tracking task produced differences in tracking performance but no differences in the amount of transfer or in the aftereffect. Ten control subjects showed no adaptation and no aftereffect.

A69-80607

Two Devices for Analysis of Nystagmus

Fred E Guedry, Jr and Gene T Turnipseed (Naval Aerospace Med Inst Pensacola, Fla)

Annals of Otolaryngology and Laryngology, vol 77, Dec 1968 p 1071-1085 19 refs

NASA supported research

Two devices are described, one similar to a trace reader and another complementary device, which facilitate measurement of nystagmus records and also facilitate the digital and analog presentation of the analyzed nystagmus data. Every individual beat and any segment of every beat can be scored when using the

electromechanical slope computer (ESC) Selected beats, segments of beats at selected points in time or at selected portions of cycles can be analyzed and related to stimulus characteristics Baseline shifts changes in signal strength blind artifacts and other noise sources can be compensated for The electronic summation device (ESD) provides much faster analysis than the ESC However the ability to analyze each beat and segments of beats is sacrificed The results of the electronic summation procedures may contain errors from unsystematic saccades blinks, muscle discharge etc If noise from these sources is excessive, manual correction is required The ESC and ESD make rapid processing available to laboratories which do not have complex computer installations Logical application of computer methods should expedite elimination of unreliable procedures and also speed establishment of valid procedures

A69-80608

EFFECTS OF INTRALIST RULE ORDER ON LEARNING CODEABLE TRIGRAMS

John A Robinson (Louisville, U. Ky)

Journal of Experimental Psychology, vol 79, Jan 1969 p 6-11
5 refs

Grant AF-AFOSR-1008-66

The Underwood and Keppel coding task was analyzed into three components encoding solution-word recall, and decoding It was argued that subjects could be expected to formulate and use letter-order rules to mediate coding The principal concern of the paper was with the effects of intralist rule order (IRO) on the learning of a two-rule list of codeable trigrams IRO was varied by presenting rule-associated trigrams in successive blocks or in successive alternations Four experiments were performed The results indicated that each task component was significantly affected by IRO though the basis of the effects varied among the three components

A69-80609

MONITORING EYE MOVEMENTS DURING THE LEARNING OF LOW-HIGH AND HIGH-LOW MEANINGFULNESS PAIRED-ASSOCIATE LISTS

P D McCormack and T E Moore (Carleton U., Ottawa, Ontario, Canada)

Journal of Experimental Psychology, vol 79, Jan 1969 p 18-21
12 refs

Grant NRC APA-78

Eye movements of subjects were monitored as they attempted to learn a high-low (H-L) or a low-high (L-H) meaningfulness (m') paired-associate list An earlier study revealed that more sustained attention is directed to low-m' than to high-m materials Predictions arising from this finding were compared with those stemming from the two-stage conceptualization The data of this study gave more support for the latter position

A69-80610

IS SELECTIVE ATTENTION SELECTIVE PERCEPTION OR SELECTIVE RESPONSE? A FURTHER TEST

Anne M Treisman and Jenefer G A Riley (Oxford U Inst of Exptl Psychol Great Britain)

Journal of Experimental Psychology, vol 79, Jan 1969, p 27-34
16 refs

Med Res Council supported research

The subjects were asked to repeat back one of two lists of synchronized digits presented dichotically They also were asked to listen for occasional letters in either ear and to stop shadowing at once and tap with a ruler if they detected one of these letters

They detected significantly more letters in the ear whose digits they were shadowing than in the other ear (an estimated 76% compared to 33%) when the target letters were in the same voice as the digits and thus required identification at the verbal level When the letters were in a different voice from the rest of the message and could be distinguished by a simpler physical characteristic subjects detected almost all of them on both ears The results are interpreted as supporting the hypothesis that the chief effect of attention in tasks with competing speech messages is to limit perception of the verbal content of secondary messages rather than to restrict responses of memory

A69-80611

EQUAL DISCRIMINABILITY SCALE OF NUMBER

Stanley J Rule (Alberta, U. Edmonton, Canada)

Journal of Experimental Psychology, vol 79, Jan 1969, p 35-38
8 refs

Grant NRC APA 151

Fifty subjects compared the subjective magnitude of circles varying in size with integers from one to ten From the relative frequency with which numbers were judged greater than circles a Thurstone-type discriminability scale of number was determined Scale values for number were found to be logarithmically related to the number stimuli indicating that number may be considered a prothetic continuum

A69-80612

MOVEMENT TIME AS A DETERMINER OF TIMING ACCURACY

Richard A Schmidt (Md U College Park)

Journal of Experimental Psychology, vol 79, Jan 1969 p 43-47
9 refs

In a task in which subjects tried to move a slide so that an attached pointer "hit" a moving target movement time was varied by having subjects move at maximal or at moderate speed by changing the starting position so that the subject moved 15 30 45 or 60 cm and by adding or not adding an additional load One hundred and sixty male right-handed subjects were assigned to one treatment combination in a $2 \times 4 \times 2$ design, and 20 trials with knowledge of results were given Absolute timing error was decreased by maximal speed instructions when the movements were unloaded by shorter movement distances under all conditions of speed and load, and by the added load when the movements were at maximal speed supporting the hypothesis that factors affecting movement time partially determine timing accuracy Evidence indicated that the responses were preprogrammed and that subjects tended to hold movement time constant and correct the error on the previous trial by adjusting starting time

A69-80613

RESPONSE PERSERVATION IN AUDITORY WORD RECOGNITION

John R Frederiksen (Mass Inst of Technol Cambridge)

Journal of Experimental Psychology, vol 79, Jan 1969 p 48-55
10 refs

Grants NIH 5T01-GM-01001 NIH 2T01 GM-01064-06 and CCNY 3233

The probability (p) of a subject changing his response on any trial in an auditory word-recognition task was estimated by fitting geometric distributions to observed distributions of intervals between successive response changes Presenting 15 trials of a word sequentially with a one-db reduction in noise on each trial (Group S) resulted in lower values of p than were obtained when

A69-80614

16 words were presented together in a randomized order at each noise level, so that the words did not occur in any predictable sequence (Group R) When subjects in Group S were divided into ordered subgroups on the basis of their susceptibility to response sets in nonperceptual problem-solving situation the subgroups were homogeneous and similarly ordered with respect to p while similar subgroups of Group R did not differ from one another Auditory recognition points were linearly related to p

A69-80614

INFLUENCE OF WORD FREQUENCY AND LENGTH ON THE APPARENT DURATION OF TACHISTOSCOPIC PRESENTATIONS

Joel S Warm (Cincinnati, U Ohio) and Ronald E McCray (Louisville U, Ky)

Journal of Experimental Psychology, vol 79, Jan 1969, p 56-58
8 refs

Contract DA-49-193-MD 2918

The apparent duration of tachistoscopically presented words of different length and frequency of use was estimated by 48 subjects Two levels of word length (short long) were combined factorially with two levels of frequency (frequent infrequent) to provide a total of four experimental conditions All stimuli were presented for one sec Judged exposure time was significantly greater for frequent as compared to infrequent words and for short as compared to long words A significant interaction between word frequency and length indicated that the effects associated with word length occurred primarily among the infrequent words and that the effects associated with frequency were most pronounced among the long words

A69-80615

LONG-TERM MEMORY EFFECTS IN THE PERCEPTION OF APPARENT MOVEMENT

Larry M Raskin (Purdue U Lafayette, Ind)

Journal of Experimental Psychology, vol 79 Jan 1969, p 97-103
17 refs

Grants PHS MH-02455, PHS HD-00098 and DRB 9401-11

Long-term memory effects in visual perception were demonstrated with the illusion of apparent movement It was found that prior experience received as long as one wk before a test session can either facilitate or interfere with the subsequent perception of the illusion Forms previously seen as moving continued to be seen as moving when presented in sequence with a very dissimilar form a condition in which apparent movement is not usually seen Forms previously seen as stationary continued to be seen as stationary when later presented in sequence with an identical form a condition favoring the perception of apparent movement The results were interpreted in terms of perceptual learning

A69-80616

APPARENT DISTANCE AS A FUNCTION OF FAMILIAR SIZE

Hiroshi Ono (Hawaii U Honolulu)

Journal of Experimental Psychology, vol 79 Jan 1969
p 109-115 16 refs

Hawaii, U supported research

Three experiments, which presented familiar figures in a two-dimensional reversible screen, were designed to test the hypothesis that familiar size can serve as a cue to perceived distance if object connotations are sufficiently potent In Exp I 24 subjects received experimental manipulation to enhance object

connotations of stimuli used in Hochberg and Hochberg's 1952 study but not the other 24 subjects For subjects who received the experimental treatment, familiar size was effective in determining apparent distance In Exp II using 48 subjects the effect was shown when stimuli with stronger object connotations were employed Exp III, also using 48 subjects indicated that the effect of familiar size, when placed against the effect of relative size can weaken the effect of relative size

A69-80617

INFLUENCE OF INSTRUCTIONS ON JUDGMENTS OF UNFAMILIAR SHAPES

A A Landauer (Western Australia, U, Perth)

Journal of Experimental Psychology, vol 79 Jan 1969
p 129-132 13 refs

An experiment using 30 subjects showed that the mean shape judgment of a slanted nonsense figure differed significantly depending on the instructions which the subject received Three types of instructions were used Real, Projective and Apparent An examination of the nature of judgments given under Apparent instructions showed that the mean Apparent judgment might not be unique but could be the result of an artifactual confounding of the type of judgments given under the other instruction conditions

A69-80618

SUBJECTIVE PROBABILITY AND DECISION STRATEGY

Lee Roy Beach and James A Wise (Wash U Seattle)

Journal of Experimental Psychology, vol 79 Jan 1969
p 133-138 8 refs

Grants AFOSR 1311-67 and PHS MH 13735-01

The subjects formed subjective probabilities (Ψ 's) for six flashing lights One group estimated Ψ 's for the six lights and for pairs of the six lights Another group bid for bets on the pairs of lights Both groups were provided with differential familiarity with some of the light frequencies It was found that estimated Ψ 's and Ψ 's inferred from bids for bets involving familiar light frequencies were both different from objective probabilities, but that they were similar to each other Bids for bets involving unfamiliar light frequencies were distorted by a strategy (underbidding) that served to increase the subjectively expected value of the bets Consequently, infrared Ψ 's for unfamiliar frequencies appeared to differ from estimated Ψ 's It was suggested that subjects' unfamiliarity were the probabilities in previous betting experiments may have led to adoption of strategies that distorted their betting behavior These distortions would in turn have led to erroneous inferences about subjects' Ψ 's and to premature rejection of decision models that use the concept of expectation maximization

A69-80619

PUPILLARY, HEART RATE, AND SKIN RESISTANCE CHANGES DURING A MENTAL TASK

Daniel Kahneman (Harvard U, Center for Cognitive Studies, Cambridge, Mass), Bernard Tursky David Shapiro, and Andrew Crider (Mass Mental Health Center, Harvard Med School Boston)

Journal of Experimental Psychology, vol 79, Jan 1969,
p 164-167 15 refs
Contract Nonr-1866(43), Grants NIMH P01 MH-12623 NIMH MH-08853-04, NIMH MH-04172-07 NIMH K3-MH-20 476-05, and NSF GS-1153

The subjects performed a paced mental task at three levels of difficulty, while time-locked recordings of pupil diameter, heart rate and skin resistance were made A similar pattern of sympatheticlike increase was found in the three autonomic functions during information intake and processing followed by a decrease

during the report phase. The peak response in each measure was ordered as a function of task difficulty.

A69-80620

MONOCULAR RECOGNITION OF LETTERS AND LANDOLT CS IN LEFT AND RIGHT VISUAL HEMIFIELDS

Howard Markowitz (Conn Coll New London) and Donald O Weitzman (Naval Submarine Med Center Groton, Conn.)
Journal of Experimental Psychology, vol 79 Jan 1969, p 187-189 12 refs

(Contract ONR N00014-67-C-0466)

As a replication of an experiment reported previously it was found that, with monocular viewing of letters superiority of right over left visual field presentations are limited to the left eye. The present experiment established that the above pattern of results is to be explained in terms of an interaction of visual acuity and right superiority. The findings suggest that acuity must be considered in combination with other variables among the determinants of hemifield differences in perceptual accuracy.

A69-80621

HUMIDIFICATION OF INSPIRED AIR

Yong H Han (St Vincent's Hosp Dept of Anesthesiol and New York Med Center N Y) and Harry J Lowe (Chicago U School of Med Ill)

Journal of the American Medical Association, vol 205 Sep 23 1968 p 907-911 8 refs

A comparative evaluation of various types of humidifiers and heat and moisture exchangers was made on normal volunteer subjects and tracheostomized patients. The respiratory water loss during oral breathing in normal adults was 27.7 mg/l of expired air which represents 75% saturation with water vapor at 32°C. It was directly proportional to the minute volumes. The new water loss from the respiratory tract decreased as the absolute humidity of the inspired air increased. Atropinized and anesthetized subjects expired 28.6 mg and 23.4 mg/l of air. Rebreathing through an external dead space of 100 ml reduced normal respiratory water loss by 3 mg. A heat and moisture exchanger reduced the normal respiratory water loss by one half. Under the usual conditions employed, with oxygen tents or nebulizers subjects were in negative water balance.

A69-80622

IRREVERSIBLE SUDDEN DEAFNESS FOLLOWING SHORT INTENSE SOUND [REVERZIBILNI NAHLE HLUCHOTY POKRATKODOBEM INTENZIVNIM ZVUKU]

M Abrahamovič

Ceskoslovenska Otolaryngologie, vol 17 Aug 1968 p 200-205 14 refs In Czech

Clinical findings are presented of five patients with sudden irreversible deafness following a single acoustic trauma. The etiopathogenetic agents taking part in the genesis of deafness are discussed. It is probable that next to hypoxia caused by intense sound other causes may play a role e.g. unnatural posture, changes in the cervical spine, focal infection, etc. Their vasomotor effect potentiates the lack of oxygen in the labyrinth and causes severe irreversible changes.

A69-80623

FUNCTIONAL SYNAPTIC ORGANIZATION OF PRIMARY VISUAL CORTEX NEURONES IN THE CAT

O Creutzfeldt and M Ito (Max-Planck-Institut für Psychiatrie, Abteilung für Neurophysiologie, München, West Germany)

Experimental Brain Research, vol 6 Oct 1968 p 324-352 31 refs

Deut Forschungsgemeinschaft supported research

The spontaneous and light evoked post-synaptic activity of cells of the primary visual cortex was investigated with intracellular and quasi-intracellular records. The resting membrane potential fluctuated mostly between 3 to 10 mv below the firing threshold owing to spontaneous EPSP- and IPSP-activity. Discharge activity was therefore low. Forms and amplitudes of the visible EPSP's showed a large variability, the frequency was 150 to 300/sec. Discrete IPSP's were between 0.5 to 3 mv and were less frequent than EPSP's (about 1/10). Their duration was only slightly longer than that of EPSP's. EPSP's and IPSP's could be elicited at on or off by appropriately positioned small light stimuli. During the initial reaction following a stimulus, single PSP's could be distinguished. Geniculate on-center as well as off-center-afferents could lead to excitation or inhibition in different neurons. The receptive fields of cortical cells to monocular stimulation were analyzed with averaged records. In each neuron two to four overlapping areas of on- or off-activation or inhibition could be distinguished. Each of these activation or inhibition zones had the functional properties of a single geniculate-cortical on- or off-center fiber with their receptive field centers separated by one to three degrees. The variety of functional organizations of the cortical neurons to monocular stimulation was explained by variable combinations of two to four converging geniculate on- or off-center fibers with either excitatory or inhibitory action and variable overlap of their receptive fields. This was tested in a simple computer model. Most neurons with pronounced reactions to movement or with direction specific movement sensitivity (about half of the neurons investigated) had an excitatory contact with an off-center fiber which seemed to be mainly responsible for the movement reaction. The findings suggest that from each eye less than five geniculocortical afferent converging fibers have a major effect on the activity of one cortical cell. Inhibitory afferents may be indirect and relayed through another cortical pyramidal cell.

A69-80624

INFLUENCE OF OXYGEN INHALATION ON THE RESPIRATION AND OXIDATIVE PHOSPHORYLATION OF THE LIVER MITOCHONDRIA IN IRRADIATED ANIMALS [VLIYANIE INGALIATSI KISLORODA NA DYKHANIE I OKISLITEL'NOE FOSFORILIROVANIE MITOKHONDRII PECHENI ZHIVOTNYKH, PODVERGSHIKHSIA OBLUCHENIYU]

E F Shamrai, L A Baran, N IA Dziubko and L G Sudarikova (Kiev Roentgen-Radiol and Oncol Inst, UkrSSR)

Bulleten' Eksperimental'noi Biologii i Meditsiny, vol 64, Oct 1968 p 41-44 In Russian

The influence of oxygen inhalation was studied in the tissue respiration and oxidative phosphorylation of the liver mitochondria after local irradiation of the liver in rabbits and total irradiation of rats. The findings showed a tendency towards a decrease, the rate of the decrease depending on the irradiation method and on the dose given. The most marked decrease was noted after local irradiation of the liver in rabbits with a dose of 6,240 r. The dynamics of the changes after total irradiation depended on the irradiation dose. The lowest levels of respiration and oxidative phosphorylation were found after total irradiation of rats on the 14th day (dose of 600 r) and on the eighth day (dose of 900 r). The inhalation of oxygen did not prevent the drop in respiration and oxidative phosphorylation but the intensity of the decrease was less.

A69-80625

pronounced demonstrating the beneficial effect of oxygen in the post radiation regenerative processes

A69-80625

THE ROLE OF NORADRENALINE IN THE ACTIVITY OF PSYCHOTROPIC DRUGS [ZNACHENIE NORADRENALINA V MEKHAIZME DEISTVIA PSIKHOTROPNYKH SREDSTV]
N B Vysotskaia P A Sharov and T M Shugina (USSR, Acad of Med Sci Inst of Pharmacol and Chemotherapy Lab of Pharmacol of Nervous System Moscow)

Bulleten Eksperimentalnoi Biologii i Meditsiny, vol 64 Oct 1968, p 54-57 19 refs In Russian

The influence of psychotropic agents (phenamine, piridrol reserpine and triptazine) on the motor activity and the behavior of rats was correlated with the changes in the noradrenaline content in the brainstem. It was shown that as the motor activity was increased by phenamine and piridrol the noradrenaline level decreased. As doses of the drugs were increased the stereotype pattern developed going at times as far as depression. This was accompanied by an even more marked drop of the noradrenaline level. The sedative effect appearing after administration of the tranquilizers reserpine and triptazine coincided in time and effect with a decreased noradrenaline content. However, the normalization of the functional state in all the experiments appeared much earlier than the normalization of the amine content. Sustained administration of reserpine showed that functional effect of psychostimulants as well as of depressants coincided with changes in the noradrenaline content in the functionally active fractions.

A69-80626

EFFECT OF CENTRAL ACTING NEUROTROPIC SUBSTANCES ON THE CONDITIONED HYPERSECRETION OF ACTH [VLIANIE NEIROTROPNYKH VESHESTV TSENTRAL'NOGO DEISTVIA NA USLOVNOREFLEKTORNUIU GIPERSEKRETSIU AKTG]

V E Ryzhenkov (USSR, Acad of Med Sci Inst of Exptl Med Leningrad)

Bulleten Eksperimentalnoi Biologii i Meditsiny, vol 64 Oct 1968 p 62-63 6 refs In Russian

Preliminary administration to dogs of neurotropic agents with central effect such as amylal aminasine, M- and N-cholinolytics metamyzy and spasmolytin decreased the conditioned reflex hypersecretion of the adrenocorticotrophic hormone (ACTH) judged by the blood 17-oxy corticosteroid content. The above agents exerted no effect on ACTH hypersecretion elicited by an unconditioned stimulus (electric shock).

A69-80627

AERIAL APPLICATION ACCIDENTS 1963 TO 1966

George A Reich (HEW Dept, PHS Bur of Disease Prevent and Environ Control Atlanta Ga) and William H Berner (Transportation, Dept Natl Transportation Safety Board, Bur of Aviation Safety, Atlanta Ga)

Archives of Environmental Health, vol 17 Nov 1968 p 776-784

One thousand three hundred and twenty-eight cases of aerial application accidents involving 1,337 aircraft (including nine collisions between aircraft) and resulting in 159 deaths during the years 1963 to 1966 were analyzed. The factors of time place aircraft and pilot were found to be associated with these accidents in a consistent and characteristic way. Specific studies are needed to determine why certain geographic areas, certain aircraft makes and models and certain categories of pilot are more likely than others to be involved in accidents and fatalities. Present determinations of probable cause in pilot error accidents are actually descriptions

of the penultimate events in the accident sequence rather than explanations of why the accident occurred. Underlying causes must be found if preventive measures are to be formulated.

A69-80628

ROLE OF HYPOXIA IN DIGITALIS TOXICITY

D C Harrison, M D Robinson and R E Kleiger (Stanford U, School of Med Dept of Med Cardiol Div, Palo Alto, Calif)

American Journal of the Medical Sciences, vol 256 Dec 1968 p 352-359 16 refs

Grants NIH HE-09058-04 NIH HE-05709-02 and NIH HE-05866-01 and Am Heart Assn supported research

The effect of moderate hypoxia produced by ventilation with gas mixtures containing lowered oxygen concentration on the dose of acetyl strophanthidin required to produce ventricular tachycardia was examined in 16 anesthetized dogs. During hypoxia (average $pO_2 = 40$ mm Hg) 19% less acetyl strophanthidin was required to produce ventricular tachycardia. The duration of the toxic arrhythmia was not different during ventilation with air or hypoxic gases. The arterial pressure and serum potassium were elevated to similar levels during air and hypoxic ventilation. The hypothetical mechanism which caused the reduced tolerance to acetyl strophanthidin was considered to be related to the effects of hypoxia on cellular sodium-potassium pumping, with resulting changes in the extracellular-intracellular potassium gradient and changes in the binding of intracellular cardiac glycosides. Changes in metabolism and alterations in blood concentration were considered as alternate explanations.

A69-80629

ANESTHETIC GASES AND WATER STRUCTURE THE EFFECT OF XENON ON TRITIATED WATER FLUX ACROSS THE GUT

Eugene Y Berger, F Rene Pecikyan and Grace Kanzaki (N Y U, School of Med, Dept of Med and Goldwater Mem Hosp N Y U Res Center, Welfare Island)

Journal of General Physiology, vol 52 Dec 1968 p 876-886 23 refs

Grants PHS R01 AM 0311-2 PHY PHS 1 R01 GM 15568-01 NEUB and HRC U-1579

Pauling and Miller have independently proposed that the presence of an anesthetic gas in tissue induces a cage-like arrangement of hydrogen-bonded water molecules. The theories recognize that most gas-hydrate crystals would not form at the temperature and pressure that exist during anesthesia and propose that other components of tissue such as protein should have a stabilizing effect. Measurements of the behavior of water, rather than the anesthetic agent would provide alternative information about the likelihood of hydrate crystal formation and this information could be such as to be applicable to body temperature and to pressures used for anesthesia. If the number of hydrogen-bonded water molecules in tissue is increased then the movement of an average water molecule should be hindered. Movement of water through the tissue may be measured by tagging it with tritium and the anesthetic gas should then slow the movement of tritiated water through the tissue. The flux of tritiated water through rat cecum is indeed slowed when the cecum is exposed to the anesthetic gas xenon which can participate biochemically only by virtue of its van der Waals interaction. The decrement in water flux is in reasonable agreement with what could be expected theoretically from calculations based on the activation energy for the self-diffusion of water and the degree of hypothermia necessary to produce narcosis.

A69-80630

MEMBRANE POTENTIAL OF BROWN ADIPOSE TISSUE A SUGGESTED MECHANISM FOR THE REGULATION OF THERMOGENESIS

L Girardier, J Seydoux and T Clausen (Genève, U Inst de Biochim Clin and Inst de Physiol, Switzerland)

Journal of General Physiology vol 52 Dec 1968 p 925-940 27 refs

Swiss Natl Fund for Sci Res supported research

Membrane potentials were recorded in isolated segments of interscapular brown adipose tissue from rats. After equilibration at 29° C in Krebs-Ringer bicarbonate buffer a mean value of -51 ± 4 mv (SD) was found. This level could be maintained for up to five hr. The mean effective membrane resistance was 1.35 ± 0.45 megohm. The membrane potential was a function of the extracellular potassium concentration. Ouabain (10^{-6} to 10^{-3} M) and incubation in K-free buffer produced progressive depolarization. Epinephrine and norepinephrine in concentrations as low as 10^{-8} g/ml produced a prompt depolarization. Cooling of the tissue and lowering of the oxygen tension caused a marked and reversible decrease in the membrane potential. In tissue obtained from cold-adapted rats the membrane potential was considerably diminished. Assuming that the membrane potential is some function of the Na permeability of the plasma membrane it is suggested that an increase in the rate of active Na-K transport and ensuing adenine diphosphate formation might contribute to the increase in respiration seen during exposure to thermogenic stimuli.

A69-80631

NITROGEN BALANCES OF ADULTS GIVEN LEUCINE AND VALINE

Susan M Kolski, Barbara Shannon, Jean M Howe and Helen E Clark (Purdue U Agr Expt Sta and School of Home Econ Dept of Foods and Nutr Lafayette Ind)

American Journal of Clinical Nutrition, vol 22 Jan 1969 p 21-26 17 refs

Grant NIAMD AM-08533

Adult human subjects were fed increasing quantities of leucine or valine in conjunction with 1.5 times the basic mixture of other amino acids previously developed in this laboratory. White wheat flour and crystalline amino acids were administered. Total daily nitrogen intake was 6.00 g. Mean nitrogen balances were 0.22, 0.36, 0.40, 0.40 and 0.22 g respectively when 1.30, 1.95, 2.90, 4.40 and 6.60 g of leucine were administered and they were 0.20, 0.34, 0.09 and 0.14 g when 1.50, 3.00, 4.50 and 6.00 g of valine were provided. A wide zone of tolerance evidently existed for leucine and valine when adequate amounts of other essential amino acids were consumed.

A69-80632

REGIONAL AND TOTAL BODY SWEAT COMPOSITION OF MEN FED CONTROLLED DIETS

Francoise Costa, Doris Howes Calloway, and Sheldon Margen (Calif U Dept of Nutr Sci Berkeley)

American Journal of Clinical Nutrition vol 22 Jan 1969 p 52-58 13 refs

NASA Contract NAS 9-3966 and Grant PHS AM10202

Sweat was collected from acclimatized young men during work on a cycle ergometer in a temperate environment. The men were divided into two matched groups of six each and fed for six wk either a diet of the type used for Project Gemini or a purified formula. Sweat was extracted from plastic-covered patches placed on the arm, back and chest collected in a plastic arm bag and

recovered from bath and laundry water. Sodium, nitrogen and potassium were measured in all samples in the total body sweat, these three and chloride, calcium and magnesium were measured. There was considerable variation in the concentrations of the various constituents between the regional sites and the body sweat. With the single exception of sodium, arm-bag sweat was the most concentrated for all constituents measured. Total body sweat was the least concentrated. The following factors were related. Sweat sodium and chloride were directly related to dietary intake, osmolality of arm-bag sweat varied directly with sodium concentration within and between dietary groups and nitrogen concentration of total body sweat varied inversely with the volume of sweat lost in the constant 40-min work test. Although the concentrations were dissimilar, sodium contents of arm-bag sweat and total body sweat were closely related ($r=0.83$). This was not true of nitrogen and potassium levels. Thus, arm-bag sweat cannot be used to predict body losses of these components. The results suggest that variation among published total body sweat nitrogen data may be rationalized by consideration of sweat rate.

A69-80633

PROPERTIES OF BLACK LIPID MEMBRANES OF CHLOROPLAST PIGMENTS

Hie Ping Ting, William A Huemoeller, Subbiah Lalitha, A Louise Diana, and H T Tien (Mich State U Dept of Biophysics East Lansing)

Biochimica et Biophysica Acta, vol 163, Dec 10 1968 p 439-450 31 refs

Grants PHS GM-14971, PHS GM-37953, PHS GM-10890 and PHS GM-01422

Physical properties of black lipid membranes formed from chlorophylls and chloroplast pigments in aqueous NaCl solutions were determined. The properties of chlorophyll black lipid membranes showed significant differences from those black lipid membranes produced from phospholipids, synthetic surfactants or oxidized cholesterol. The chlorophyll black lipid membranes as measured by a reflectance technique had a thickness of about 105 ± 5 Å. Possible sources of error in assessing the membrane thickness were discussed. The bifacial tension of the chlorophyll black lipid membranes in 0.1 M NaCl as measured by the bulging method was found to be 3.8 to 4.5 dynes/cm. The permeability to water of chlorophyll black lipid membranes was determined by an osmotic flow method. NaCl was used as the solute. A value 51μ /sec was obtained for the permeability coefficient. The effect of temperature on water permeability was also investigated. The Arrhenius activation energy was found to be 4.2 kcal/mole. Electrical parameters of chlorophyll black lipid membranes were measured in various NaCl solutions (10^{-3} to 1 M). In dilute solutions ($10^{-2.5}$ M or less) the d.c. resistance was 10^6 to $3 \cdot 10^6 \Omega \text{ cm}^2$. At higher concentrations, the resistance of the membrane was lower by a factor of ten. The temperature dependence of membrane resistance was measured. A value 15.9 ± 0.3 kcal/mole was obtained for the activation energy. It was concluded that black lipid membranes produced from chloroplast pigments are useful model systems for further investigation which may give insight into the processes relevant to photosynthesis.

A69-80634

THE EFFLUX OF POTASSIUM FROM CHLORELLA PYRENOIDOSA

J Barber (East Anglia U School of Biol Sci, Norwich Great Britain)

Biochimica et Biophysica Acta, vol 163 Dec 10 1968, p 531-538 20 refs

A69-80635

Potassium efflux from *Chlorella* cells was studied by means of radiotracer. The kinetics of the efflux suggested that the exchange of the majority of the internal K^+ is controlled by a first-order process. The efflux rate under conditions of no net K^+ movement is approximately 1 pmole K^+ /sec/cm² in the light but falls to 0.3 pmole K^+ /sec/cm² for dark treated cells. The efflux was sensitive to temperature and metabolic inhibitors in a way not expected for a simple passive leak through a relatively permeable membrane. In the absence of external K^+ the efflux was very low and not until this cation or Rb^+ was replaced in the suspension medium did the cells readily lose tracer. The results are tentatively interpreted in terms of a metabolically controlled K^+-K^+ exchange system possibly involving a membrane carrier.

A69-80635

THE DANGERS OF DYSBARISM

Robert B Stonehill and Raymond H Murray (Ind U School of Med, Indianapolis)

Journal of the Indiana State Medical Association vol 62 Jan 1969, p 41-43 16 refs

With the increased use of commercial jet aircraft the possibility of loss of cabin pressurization and subsequent high altitude exposure of the occupants increases. The effects of reduced barometric pressure results from gases trapped within the body cavities or the evolution of gases from the liquid phase within the tissues of body fluids. In general trapped gases can be quite discomforting but not usually dangerous unless the pressures generated are very great. However, the problems that arise when nitrogen in the body fluids or fat tissues comes out of solution can be life threatening. A significant percentage of the flying public can be considered dysbarism prone. Here manifestations are bends (with extremity pains) chokes (with respiratory distress, substernal pain and dry cough) and neurocirculatory collapse. When circulatory failure becomes evident mortality can be expected to be high and intensive care is essential. It is advocated that the individuals who experience any symptoms of dysbarism be observed for at least two hr after removal from the altitude exposure. Generally treatment is supportive and includes the administration of oxygen. However, it appears that the early correction of reduced circulatory plasma volume and the placement of the patient in a recompression chamber in an attempt to redissolve the bubbles may also be essential in severe cases.

A69-80636

THE ACCURACY OF REPRODUCING TARGET POSITIONS UNDER VARIOUS TENSIONS

George E Stelmach (Calif U, Santa Barbara)

Psychonomic Science, vol 13, Dec 25 1968 p 287-288
Grant UC 571

Using a lever positioning task six groups of 10 subjects attempted to reproduce target positions of 25° or 65° under tension levels of either 0.5 or 10 lb. It was found that the accuracy of reproduction was facilitated by the increased resistance at the 65° target position. No increase in accuracy was found at the 25° target.

A69-80637

TEMPORAL DISCRIMINATION AS A FUNCTION OF TOTAL PRESENTATION TIME

Donald H Thor and Herman H Spitz (E R Johnstone Training and Res Center, Bordentown N J)

Psychonomic Science, vol 13, Dec 25, 1968 p 291-292 5 refs

Two triangles (Δ and ∇) were presented successively at the same spatial locus for binocular viewing. Manipulation of stimulus duration and interstimulus interval revealed that accuracy in discriminating order is dependent upon total time ($S_1 + ISI + S_2$) and that the discrimination threshold (75% correct) is approximately 100 msec.

A69-80638

TACTUAL SIZE PERCEPTION WITH THE METHOD OF MAGNITUDE ESTIMATION

Jon E Roeckelein (Ariz State U Tempe)

Psychonomic Science, vol 13 Dec 25 1968 p 295-296 11 refs

Three experiments which employed the psychophysical method of direct magnitude estimation were conducted in order to scale the stimulus dimension of size via active touch perception. Power functions were adequately fitted to the data for both one-trial and multi-trial presentations of an assigned modulus. Results obtained when subjects provided their own primary modulus were characterized by small nondiscriminating ranges of size estimation. Various sensing and exploring movements made by subjects during the active touch perception tasks were discussed.

A69-80639

THE RELATION OF CORRECT AND ERROR RESPONSES IN A SERIAL CHOICE REACTION TASK

David Hale (Aston U Appl Psychol Dept, Birmingham Great Britain)

Psychonomic Science, vol 13 Dec 25, 1968 p 299-300 13 refs

Sci Res Council supported research

Error and correct response times (RT) were calculated for a serial choice task with two, four and eight alternatives over five sessions practice. Error RT were faster than corresponding correct RT and varied in the same way as the correct RT with different numbers of alternatives and degree of practice. Error RT were analyzed in detail according to sequential transitions. Eighty-five per cent of errors directly following errors were attempts at error correction. These results are discussed in terms of serial classification and statistical decision models.

A69-80640

EFFECTS OF INFORMATION FEEDBACK AND REFERENCE TONES ON SIGNAL DETECTION

Allan Nash and Robert Adamson (Fla Atlantic U Boca Raton Fla)

Psychonomic Science, vol 13 Dec 25 1968, p 301-302 7 refs

Grant AFOSR 1163-66

An auditory signal detection study feedback and no-feedback conditions were compared and the effect of introducing anchor or reference tones during the intertrial interval was investigated. Feedback increase the proportion of correct detection as did the presence of a strong anchor. The latter condition was also associated with a reduction of false alarms.

A69-80641

MAGNITUDE ESTIMATION OF PERCEIVED DISTANCE OVER VARIOUS DISTANCE RANGES

Robert J Vincent, Bill R Brown, Robert P Markley and Malcolm D Arnoult (Tex Christian U Fort Worth)

Psychonomic Science vol 13, Dec 25 1968, p 303-304 15 refs

NASA Contract NAS 21481 and NASA Grant NGR 44 009 018

Three groups of subjects made magnitude estimation judgments

of the apparent distance of a stationary space vehicle model under conditions simulating outer space Psychophysical functions for three stimulus ranges were obtained The exponents for the near and far stimulus ranges were 1.0 The power function exponent for the full range group was 0.48 The psychophysical scales were compared to JND scales obtained in previous research The results indicated that in all ranges investigated the power law is an appropriate description of the relationship between perceived and objective distance but that distance range and the location of the range are important determinants of the psychophysical scale

A69-80642

INFORMATION LOAD, TIME SPENT, AND RISK TAKING IN COMPLEX DECISION MAKING

Siegfried Streufert and Susan C. Streufert (Purdue U., Lafayette Ind.)

Psychonomic Science, vol. 13, Dec. 25, 1968, p. 327-328, 330, 6 refs

NASA supported research

The effect of the quantity of information which decision makers receive per unit time and the effect of the length of time spent in decision-making groups on the degree of risk taking in decision making were examined. A simulated decision-making task of some complexity was used for data collection to permit comparison with results obtained in simpler laboratory settings. It was found that risk taking increases with time spent in decision making and reaches highest levels under optimal information conditions. Parallels to studies in simpler environments were examined.

A69-80643

THE EFFECT OF SET UPON LENGTH ESTIMATION IN ACTIVE TOUCH PERCEPTION

Jon E. Roeckelein (Ariz. State U., Tempe)

Psychonomic Science, vol. 13, Dec. 1968, p. 193-194, 7 refs

Three groups of subjects performed a task requiring the reproduction of unseen objects which were felt through a curtain. One group (RT) received rod-length training, another group (LT) received letter training, and a third group (NT) received no training. Comparisons of group responses showed that the experimental group (RT) and control groups (NT, LT) differed significantly and demonstrated that a preparatory set involving rod-length estimation could be induced in subjects using active touch perception.

A69-80644

SIMPLICITY AS A PRINCIPLE IN TACTUAL FORM PERCEPTION

Jon E. Roeckelein (Ariz. State U., Tempe)

Psychonomic Science, vol. 13, Dec. 5, 1968, p. 195-196, 9 refs

Simplicity was operationally defined using measurable characteristics of stimuli. High correlations between these objective models and subjects' rank ordering of stimuli along a simplicity-complexity continuum permitted the application of the simplicity principle to active touch form perception. The comparison of two methods of stimulus presentation for active touch showed that a whole method using simultaneous presentation of stimuli was superior to a part method using paired comparisons. The information processing capacity of subjects for tasks employing active touch was also discussed.

A69-80645

INFORMATION AVAILABLE FROM BRIEF VISUAL PRESENTATIONS USING TWO TYPES OF REPORT

Carmen M. Lawrence and John Ross (Western Australia U., Nedlands)

Psychonomic Science, vol. 13, Dec. 5, 1968, p. 199-200, 10 refs

The effects of the acoustic and structural similarity of letters on the accuracy of report were studied using two partial report measures. Subjects in Group 1 were required to compare two cued letter pairs on an eight-letter array, and to report whether they were the same or different (CJ), while Group 2, in addition to CJ, had also to report the names of the letters comprising the pairs (CR). The data showed that while CR resulted in a decline in accuracy with increasing cue delay as reported by Sperling, the CJ measure showed an increase in accuracy. Structural similarity of the target pairs increased the difficulty of both CJ and CR reports over the first 100 msec. An interpretation is offered in terms of a structural trace which does not decay, and in which structural features are sharpened and exaggerated to enhance the discriminability of the components.

A69-80646

DIFFERENTIAL EFFECTS OF TWO TYPES OF AVERSIVE AROUSAL ON DISCRIMINABILITY

James Bieri (Tex. U., Austin) and Bruce Meyers (Brooklyn Coll. N.Y.)

Psychonomic Science, vol. 13, Dec. 5, 1968, p. 203-204, 7 refs
Grant NSF GS-842

The effects of two types of aversive arousal, white noise and electric shock, upon discriminability were investigated in two studies using information analysis. Results indicated that while discriminability was affected in both studies as a function of arousal, there was a differential effect in the unreliability component of subjects' responses. White noise increased the unreliability of responding while shock tended to decrease the unreliability. These differences are discussed in terms of drive and attention properties of the two forms of arousal.

A69-80647

STABLE HOURS AND VARIED WORK AS AIDS TO EFFICIENCY

Robert T. Wilkinson and Robert S. Edwards (Appl. Psychol. Res. Unit, Cambridge, Great Britain)

Psychonomic Science, vol. 13, Dec. 5, 1968, p. 205-206, 7 refs
Med. Res. Council supported research

Stabilization of shift times and rotation of jobs within a shift has enabled a two-man system of continuous manning to outperform a three-man arrangement which lacked these features. In vigilance-type tasks calling for sustained attention, it is probably the job rotation which is important in more intense cognitive tasks such as complex decision-taking. It may be stabilization of daily shift times which confers the advantage with job rotation doing more harm than good.

A69-80648

EFFECT OF SIGNAL SATIATION ON SIGNAL DETECTION IN AUDITORY VIGILANCE

J. P. Das (Alberta U., Edmonton, Canada) and Pratibha Pradhan (Ravenshaw Coll., Cuttack, India)

Psychonomic Science, vol. 13, Dec. 5, 1968, p. 211-212, 7 refs

Sixty subjects in a vigilance task were required to detect the appearance of three odd numbers in succession in a random series of numbers between one and nine. Following a 30-min performance, half of them were satiated on the five odd numbers between one and nine, whereas the other half had an irrelevant task. Immediately afterwards, both groups took the vigilance task for

A69-80649

10 min Results showed that the satiated group committed considerably more errors in signal detection than the nonsatiated group, and within the satiated group the high satiators had poorer vigilance than the low satiators

A69-80649

ALLOWING FOR THE ORIENTING RESPONSE IN GSR CONDITIONING

Harry A Lando and Roland H Tanck (The George Washington U Washington D C)

Psychonomic Science vol 13 Dec 5, 1968 p 213-214 11 refs

Grant NSF GY 2765

In an experiment designed to partial out the orienting response 16 college students observed a series of lights of four colors These lights were presented one at a time in random order There were 120 stimulus presentations each lasting 7.5 sec As there was no interstimulus interval the duration of the procedure was exactly 15 min Pairing of a mild electric shock with the critical signal (amber light) occurred only during the middle third of the experiment thus enabling a direct comparison of the responses before and after conditioning The GSR recordings showed conditioning to be highly significant ($p < .001$)

A69-80650

A METHODOLOGICAL NOTE ON DIRECT TESTS OF THE EFFECTIVENESS OF POSITIONAL CUES IN SERIAL LEARNING

John R Heslip (Kan U Lawrence)

Psychonomic Science vol 13 Dec 5 1968 p 221-222 5 refs

In direct tests of the effectiveness of cues that can be ordered conceptually along some dimension such as spatial or ordinal position the subject is presented with a test cue and asked to respond with an item from the corresponding position in the serial list Although it is assumed that the subject uses only the test cue to mediate recall, it is possible that he is able to locate the correct response by covertly reciting and counting a sequence of items from the list Three groups of 13 subjects were used to show that a recitation confounding can occur and that it can be estimated with instructions and a three sec response time-limit The results also showed that the test method is a consistent measuring device over different degrees of acquisition

A69-80651

POSTURAL SET AS A FACTOR IN SHORT-TERM MOTOR MEMORY

Richard A Schmidt (Md U College Park) and George E Stelmach (Calif U Santa Barbara)

Psychonomic Science vol 13, Dec 5, 1968 p 223-224 5 refs
Grant UC 571

The present study attempted to differentiate between a set vs an interference explanation of the decrements in recall when activities are included in the retention interval Using a lever-positioning task with three retention intervals (12, 22, and 37 sec) and two types of activity during the retention interval, it was found that movement caused a significant overestimation of the target position using algebraic error and that a movement by retention interval interaction was not significant Since the decrements in recall were independent of the retention interval length the results indicated that the effect of movement was to reduce the subject's postural set No differences were found when using absolute errors

A69-80652

ASSESSMENTS OF TEMPORAL DISCRIMINATION IN VISION

Daniel N Robinson (Amherst Coll Mass)

Psychonomic Science vol 13, Dec 5, 1968, p 247 5 refs

Conflicting results have been obtained in assessments of the discrimination of visual order under dichoptic viewing conditions Part of the difficulty has centered on experimental controls a more important part on the interpretation of results In vision, much of the filtering of stimulus information is achieved at a peripheral (neuro-retinal) level of processing Eliminating the peripheral sources of filtering (inhibition) or reducing their effects with dichoptic presentation methods results in more valid estimates of the central capacity to resolve in time

A69-80653

MONAURAL TEMPORAL MASKING OF TRANSIENTS

Harvey Babkoff and Samuel Sutton (N Y State Dept of Mental Hyg Biometrics Res New York)

Journal of the Acoustical Society of America, vol 44 Nov 1968 p 1373-1378 26 refs

PHS supported research

Using an experimental paradigm in which both masking and probe-click intensity are fixed and the temporal interval is manipulated we investigated forward and backward masking for various intensities of masking and probe clicks For both masking modes, monaural temporal masking is found (1) to increase logarithmically as a function of increasing masking-click level, and (2) to decrease as a function of increasing probe-click level The amount of masking is greater for the forward than for the backward mode Intense masking clicks and weak probe clicks produce the greatest difference between forward and backward masking For both forward and backward modes, masking is found to be less than previously reported A peripheral latency-intensity conversion hypothesis appears adequate to account for these data

A69-80654

EFFECT OF HARMONIC COMPONENTS ON FREQUENCY DISCRIMINATION

G Bruce Henning and Sheila L Grosberg (Defence Res Estab Toronto, Downsview, Ontario Canada)

Journal of the Acoustical Society of America vol 44 Nov 1968 p 1386-1389 8 refs

The effect of the presence of harmonics on frequency discrimination is measured as a function of the frequency of the fundamental component of the signal For signals of fundamental frequency greater than approximately 2,000 c.p.s., harmonic components have little or no effect on the ability of observers to discriminate differences in frequency Below approximately 2,000 c.p.s. however differences in the frequency of signals containing harmonically related components are more readily discriminated than differences in the frequency of sinusoidal signals These findings relate to the dependence of frequency discriminability on frequency

A69-80655

SENSITIZATION IN THE AUDITORY AND TACTILE SYSTEMS FOLLOWING EXPOSURE TO LOW AND MODERATELY INTENSE STIMULATION

Thomas J Moore (Aerospace Med Res Labs Neurophysiol Branch, Wright-Patterson AFB Dayton Ohio)

Journal of the Acoustical Society of America, vol 44 Nov 1968, p 1390-1400 13 refs

A series of investigations into the sensitization of the auditory and tactile systems by prior stimulation is reported Two apparently

different types of sensitization were found (1) a sustained type that was elicited following exposure to low-intensity stimulation and which may be related to the density of functional receptor elements in the region stimulated (2) a transitory type that required exposure to moderately intense stimulation and which apparently occurred only when two regions of differing sensitivity were stimulated simultaneously. In the auditory system, sustained sensitization appeared in both the ipsilateral and contralateral ears; transitory sensitization occurred only in the ipsilateral ear.

A69-80656

PHYSIOLOGICAL BASIS OF THE ALPHA RHYTHM

Per Andersen (Oslo U., Inst. of Neurophysiol., Norway) and Sven A. Andersson (Göteborg U., Dept. of Physiol., Sweden). New York: Appleton-Century-Crofts, 1968. vii+235 p. Many refs. Grant PHS NB 04764. Eli Lilly Res. Found. supported research.

This book is a review and analysis of data collected over the last 40 yr. by various research groups. The problem of understanding brain rhythms were studied in two ways: (1) by analysis of brain neuron organization, especially those of the thalamus and cortex; and (2) studying spinal tract patterns and their activity to see the cortical effects. The concept of parcellation of the synchronizing and desynchronizing cortical effects is the result of this work. Topics of discussion include patterns of cortical and thalamic activity, evoked thalamic rhythms and the effects of pharmacological compounds on spontaneous rhythmic thalamocortical activity.

A69-80657

OSMOTIC THIRST: THEORETICAL AND EXPERIMENTAL ANALYSIS

John D. Corbit (Brown U., Providence, R.I.). *Journal of Comparative and Physiological Psychology*, vol. 67, Jan. 1969, p. 3-14. 21 refs.

A theoretical model for osmotic (cellular dehydration) thirst is presented and several of the implications of the model are evaluated experimentally. The concentration of effective osmotic solute dissolved in the body fluids of the rat in water balance is $\alpha = 150$ M. The model for osmotic thirst asserts that when a load consisting of n mmols of effective osmotic solute dissolved in v ml of water (such that $n/v > \alpha$, i.e., it is a hypertonic load) is introduced into the extracellular compartment, the animal will drink a volume of water D (in ml), which is proportional to the volume of water D_{iso} (in ml) required to dilute the hypertonic load to isotonicity (α). Thus $D = k(D_{iso}) = k[(n/\alpha) - v]$, where k is the constant of proportionality representing the contribution of the kidney to osmotic regulation. The experimental data show that under conditions of osmotic thirst this model accurately predicts the rat's drinking behavior.

A69-80658

MAGNITUDE OF ELECTRODERMAL RESPONSE TO A STANDARD STIMULUS AS A FUNCTION OF INTENSITY AND PROXIMITY OF A PRIOR STIMULUS

William W. Grings and Anne M. Schell. *Journal of Comparative and Physiological Psychology*, vol. 67, Jan. 1969, p. 77-82. 10 refs. Grant NIMH MH-03916.

When successive stimuli elicit multiple galvanic skin responses (GSR), the response to the second stimulus may be determined by properties of the preceding response. To test these relationships, 27 subjects were administered paired-noise stimuli in which the properties of the first noise were varied by changes in intensity

(80, 90, and 98 db) and duration (2, 4, 5, 6, 8, and 10 sec). The second noise was of standard intensity and duration (100 db, 2 sec) starting at the offset of the first stimulus. Magnitude of GSR to the second stimulus varied systematically with first stimulus intensity and duration. The more intense the first stimulus and the shorter the interstimulus interval, the smaller was the magnitude of response to the second stimulus. An interference explanation was postulated.

A69-80659

PERCEPTUAL PHENOMENA AND PERSONALITY IN SENSORY DEPRIVATION

J. P. Leff (Maudsley Hosp., London, Great Britain). *British Journal of Psychiatry*, vol. 114, Dec. 1968, p. 1499-1508. 23 refs. Bethlehem Roy Hosp. and Maudsley Hosp. Res. Fund supported research.

A brief review is presented of the field of sensory deprivation. Three hypotheses were tested: (1) that the perceptual experiences of normal subjects under conditions of sensory deprivation are akin to or identical with those of mentally ill patients; (2) that the reporting of perceptual experiences under these conditions is associated with schizoid personality traits; and (3) that subjects would assimilate their played-back voice into their thought content under these conditions. Hypotheses (1) and (2) were verified. It was found that the great majority of perceptual experiences occurred in full consciousness. The findings are discussed, and it is concluded that experiments in sensory deprivation are of value in increasing our understanding of mental illness.

A69-80660

EFFECTS OF UNCERTAINTY AND IMPORTANCE ON INFORMATION SEARCH IN DECISION MAKING

John T. Lanzetta and James M. Driscoll (Louisville U., Ky.). *Journal of Personality and Social Psychology*, vol. 10, Dec. 1968, p. 479-486. 11 refs. Grants Nonr 3897-07 and AF 49(638)-1441.

The joint effects of uncertainty (H) and importance (I) on information search were examined for three decision tasks and two types of importance (possible gain and loss). Results showed that mean search increased with H and was at a consistently higher level for high-importance conditions. However, there were no observable differences in the effects of gain and loss manipulations of I. Furthermore, the predicted multiplicative relationship between H and I failed to occur, but rather an additive effect was indicated. Post hoc analysis of H in high- and low-importance conditions suggested that this additive effect was a function of increases in H induced by I conditions. It appears that importance effects are in part mediated by uncertainty.

A69-80661

EFFECT OF SUBLETHAL HEAT ON THE METABOLIC ACTIVITY OF STAPHYLOCOCCUS AUREUS

Leslie Bluhm and Z. John Ordal (Ill. U., Dept. of Food Sci., Urbana). *Journal of Bacteriology*, vol. 97, Jan. 1969, p. 140-150. 40 refs. Grant PHS UI-00174.

Cells of *Staphylococcus aureus* MF-31 which have been heat-injured at 52° C. have an altered metabolic activity. Analyses of whole-cell preparations by means of the Thunberg technique and Warburg manometry showed decreased dehydrogenase activity and oxygen uptake on a variety of substrates. In cell-free extracts prepared from injured cells, it was demonstrated that the specific activity of fructose diphosphate aldolase, lactate dehydrogenase, and

A69-80662

butanediol dehydrogenase was less than that of extracts prepared from normal unheated cells. Recovery of the heat-injured cells in a suitable medium supported a return of the dehydrogenase activity and oxygen uptake, but the activity of the enzymes in cell-free extracts prepared from such partially recovered cells did not fully return to the level of normal (unheated) preparations. Addition of chloramphenicol or actinomycin D to the recovery medium singly or in combination retarded the return of the normal metabolic activity. Radiorespirometric experiments indicated that the percentage participation of the Embden-Meyerhoff Parnas and hexose monophosphate pathways remained the same for normal and heat-injured cells. The sublethal heat treatment decreased the catabolic capabilities of *S. aureus* and the production of selected end products associated with the metabolism of glucose.

A69-80662

HEAT-SENSITIVE STEP IN DEOXYRIBONUCLEIC ACID-MEDIATED TRANSFORMATION OF BACILLUS SUBTILIS

Charlotte McCarthy and Eugene W. Nester (Wash. U., Depts. of Microbiol. and Genetics, Seattle)

Journal of Bacteriology, vol 97, Jan 1969, p. 162-165, 11 refs.

Grants PHS 5-F1-GM-28412 and NSF GB 5951

Over 90% of the competent cells in a population of *Bacillus subtilis* lost their competence after being heated to 50°C for five min. There was only a slight loss in the number of transformants if the culture was heated for five min after the termination of transformation, but 90% of the transformants were lost after one hr at 50°C. The population as a whole grew at a slightly faster rate at 50°C than at 32°C. It is postulated that a heat-labile factor is required for the uptake or retention (or both) of deoxyribonucleic acid (DNA) in the cell, since uptake of ³²P-DNA into a deoxyribonuclease resistant form was inversely proportional to the time of exposure to heat. Cells that had lost competence after being heated did not regain their competence for at least several hours, although other cells in the population became competent. These data suggest that the heat-labile factor required for competence is synthesized only once during the period that a cell remains competent.

A69-80663

UTILIZATION OF AMINO ACIDS AS A SOURCE OF NITROGEN BY HYDROGENOMONAS EUTROPHA

Elizabeth C. B. Fraser-Smith, Melissa A. Austin, and Lawrence L. Reed (Lockheed Missiles and Space Co., Res. Labs., Palo Alto, Calif.)

Journal of Bacteriology, vol 97, Jan 1969, p. 457-459, 7 refs.

A study investigating the ability of wild-type *Hydrogenomonas eutropha* to use a variety of amino acids as a sole nitrogen source under autotrophic growth conditions. The L isomers were employed in the study. All experiments were made in a series of eight 250-ml Erlenmeyer flasks connected to a manifold and gas reservoir bottles. The ability of *H. eutropha* to use the various amino acids was determined in two different gaseous environments: (1) 70% H₂, 20% O₂, and 10% CO₂, and (2) 70% N₂, 20% O₂, and 10% CO₂. It was determined that *H. eutropha* can use a wide variety of amino acids as a sole nitrogen source for growth if energy is available from the oxidation of H₂. All of the amino acids which tested positive, with the exception of tryptophan, lysine, cystine, and β-amino isobutyrate, were capable of producing at least a 20-fold increase in the cell population. Only ornithine, arginine, citrulline, methionine, and hydroxyproline did not support growth.

A69-80664

A GERM-FREE INFANT

R. D. Barnes, Jean Holliday, Alina Piesowicz, D. V. I. Fairweather, C. Keane, et al. (U. Coll. Hosp., Dept. of Obstet. and Inst. of Child Health and Hosp. for Sick Children, Depts. of Hematol., Immunol., Child Health, and Microbiol., London, Great Britain)

Lancet, No 7587, Jan 25, 1969, p. 168-171, 22 refs.

Med. Res. Council Wellcome Trust, Camilla Samuel Trust, Great Ormond Street Hosp., and Inst. of Child Health supported research.

An infant was delivered by caesarean section and maintained in a germ-free isolation unit for six days during which absence of bacteria was demonstrated by microbiological tests. This procedure was done as part of a program for the treatment of potential cases of immunity deficiency, but since this infant was not affected with combined immunity deficiency state, as her brother had been, she was removed from the germ-free isolation unit.

A69-80665

THE EFFECT OF HYPOXIA ON THE ACTIVITY OF GLUCOSE-6-PHOSPHATE DEHYDROGENASE, HEXOKINASE AND LACTATE DEHYDROGENASE IN THE RAT ERYTHROCYTES [VLIANIE GIPOKSII NA AKTIVNOST' GLIUKOZO-6-FOSFAT-DEGIDROGENAZY, GEKOKINAZY I LAKTATDEGIDROGENAZY V ERITROTSITAKH KRYSA]

L. N. Simanovskii, M. N. Pertseva, and N. M. Livshits (USSR Acad. of Sci., I. M. Sechenov Inst. of Evolutionary Physiol. and Biochem., Leningrad)

Biokhimiia, vol 33, Sep.-Oct. 1968, p. 942-945, 28 refs. In Russian.

An investigation was conducted on male albino rats to study the effect of 30 days at a simulated altitude of 7,600 m in a pressure chamber and at 3,200 m in the mountains on the activity of glucose-6-phosphate dehydrogenase, lactate dehydrogenase, and hexokinase in the erythrocytes. The results showed an increase in the hexokinase and lactate dehydrogenase activity and a decrease in the glucose-6-phosphate dehydrogenase activity due to the adaptation in the pressure chamber and an increase in the activity of glucose-6-phosphate dehydrogenase and lactate dehydrogenase as a result of the acclimatization to high altitude. The changes observed were attributed to biochemical adaptation.

A69-80666

VARIATION OF BLOOD SERUM PROTEIN FRACTIONS IN ANIMALS IN PROLONGED EXPOSURE TO NOISE [BELKOVE FRAKTSII SYVOROTKI KROVI U ZHIVOTNYKH PRI DLITEL'NOM VOZDEISTVII SHUMA]

N. N. Pushkina, N. F. Svadkovskaya, and I. N. Konstantinova (USSR, Acad. of Med. Sci., A. N. Sytin Inst. of Gen. and Communal Hyg., Moscow)

Vrachebnoe Delo, no 9, Sep. 1968, p. 98-100. In Russian.

Prolonged exposure (36, 108, 144, 216, and 252 hr) of rats to white noise with a frequency range of 50 to 5,000 cps and 80 db intensity produced changes in the blood serum protein fractions expressed by hypoalbuminemia, hyperglobulinemia, and a decrease of the albumin-globulin coefficient value. No changes were observed in the nucleic acids content of the rats' liver, spleen, and kidneys. Prolonged exposure (236 and 258 hr) of guinea pigs to the same acoustic parameters induced no changes in the concentration of the blood serum protein fractions.

A69-80667

PHOTOPROTECTING ACTION OF A NADSONIELLA NIGRA PIGMENT [FOTOPROTEKTORNOE DEISTVIE PIGMENTA NADSONIELLA NIGRA]

S P Liakh and E L Ruban (USSR, Acad of Sci Inst of Microbiol, Moscow)
Mikrobiologiya, vol 37, Sep-Oct 1968, p 862-864 7 refs
 In Russian

Exposure to X-rays irradiation produced a mutant of *Nadsoniella nigra* (1-365) which synthesized intensively an extracellular pigment when cultivated on a mineral medium with glucose and yeast autolysate. Water solutions of this pigment had a high ability for protecting cells of a radiosensitive yeast strain *Candida utilis* 295 from the lethal action of UV irradiation in 0.15% concentration. This seemed to be due to a screening effect.

A69-80668

CHANGES IN THE INTERNAL ORGANS OF MICE IN HYPOXIC HYPOXIA [IZMENENIYA VO VNUTRENNIKH ORGANAKH MYSHEI PRI GIPOKSICHESKOI GIPOKSII]

V V Portugalov, A S Kaplanskiy, and G N Durnova (USSR Min of Health Inst of Med-Biol Problems, Moscow)
Arkhiv Patologii, vol 30, no 9, 1968, p 39-45 14 refs
 In Russian

Presented was histological study of the heart, lungs, liver, kidneys, testicles, spleen, and lymph nodes of mice placed for 24 hr in a ventilated pressure chamber at 286 mm Hg for two wk at a pressure of 378 mm Hg. The findings showed that hypoxia, especially a prolonged one, led to the development of grave dystrophic lesions in the internal organs. It was inferred that the increase of the animals' resistance to hypoxia after acclimatization could not serve as a criterion of absence of serious pathological lesions in the internal organs.

A69-80669

UNIT RESPONSES TO VISUAL STIMULI IN THE SUPERIOR COLLICULUS OF THE UNANESTHETIZED, MID-PONTINE CAT

J M Sprague, P L Marchiafava, and G Rizzolatti (Pisa U, Ist di Fisiol and CNR Lab di Neurofisiol, Italy)
Archives Italiennes de Biologie, vol 106, Sep 1968, p 169-193 60 refs

Contract AF 61(052)-830 and Grant NIH NB 05506

Single unit activity in the superior colliculus of curarized, pretrigeminal midpontine cats was studied using moving visual stimulus objects and spots of light and changes in diffuse light. These results indicate that (1) units in all laminae are strongly driven by moving stimuli, (2) many units, particularly in the deeper laminae, show direction specificity and habituation, (3) some units located preponderantly in the superficial gray lamina respond to the diffuse light, (4) spontaneous activity in collicular units is not marked, (5) the receptive fields are of varied shapes and sizes (5° to 70°), although the smaller fields lie near area centralis, a few are partly or wholly in the ipsilateral visual hemifield, (6) the receptive fields appear homogeneous in that the same moving stimulus is effective in all parts of the field, (7) tectal units are functionally organized in vertical columns—the neurons encountered in a single penetration have overlapping receptive fields and similar direction preferences to moving stimuli, and (8) the lesion-marked position of unit recordings demonstrates a retinotopic organization in the colliculus. The phenomenon of habituation of response to repeated identical stimuli in collicular units is qualitatively similar to that seen in vertical following movements of the eyes in this preparation. Both processes have the same time course, as does the recovery (dishabituation). Some units show marked instability in response and its habituation to moving stimuli, accompanied by fluctuations of the size and shape of receptive fields. The instability

is shown in certain cases to be related to the level of excitation of one portion of the field (center) to the state of the electrocorticogram, and to anesthetics.

A69-80670

ANALYSIS OF THE PIGEON'S ELECTRORETINOGRAM

L Cervetto (CNR Lab di Neurofisiol, Pisa, Italy)
Archives Italiennes de Biologie, vol 106, Sep 1968, p 194-203 26 refs

Contract AFOSR EOAR F 6 1052 67 C 0028

The responses of the pigeon's electroretinogram (ERG) to photic sinusoidal stimulation were recorded under various conditions of illumination, with and without anesthesia. It was shown that there is a higher frequency response under photopic illumination. At low frequencies of light stimulation an ERG response with a frequency double that of the light stimulus was consistently found. This phenomenon of non-linearity can be suppressed either by lowering the average light intensity of the stimulus or by injecting small doses of Ethylurethane. The anatomical location of the non-linear circuits is probably at the level of the inner nuclear layer.

A69-80671

PHOTIC REFLEX AND PRETECTAL REGION

A Cavagioni, I Madarász, and A Zampollo (Parma U, Ist di Fisiol Umana, Italy)

Archives Italiennes de Biologie, vol 106, Sep 1968, p 227-242 57 refs

Grant AFOSR EOAR 66-26, 67-7 and Consiglio Nazl dell Ric supported research

The relationship between the pupillary photic reflex and the activity of pretectal units was investigated in the midpontine pretrigeminal preparation. The main findings were: (1) some pretectal units are excited both phasically and tonically by light; they are probably concerned with the onset and maintenance of the photic reflex, (2) some units are tonically inhibited by light and show a sustained discharge at the end of illumination. They may be involved in the active mechanism which causes pupillary dilatation in response to darkness, and (3) other units respond only phasically to light and/or darkness.

A69-80672

TONIC NEURONAL ACTIVITY OF THE CENTRAL VISUAL PATHWAYS DURING DARK ADAPTATION

R Corazza, M Endo, V Tradardi, and C Umiltà (Parma U, Ist di Fisiol Umana and Bologna U, Ist di Psicol, Italy)

Archives Italiennes de Biologie, vol 106, Sep 1968, p 270-282 55 refs

Grant AFOSR EOAR 65-8 and Consiglio Nazl delle Ric supported research

Single fibers were isolated from the afferent (geniculo-cortical) and efferent (cortico-fugal) visual cortical tracts in cats, and their dark discharge was studied in terms of interval distribution of successive spikes and mean frequency under barbiturate anesthesia or in unanesthetized midpontine-pretrigeminal preparations. In both preparations interval distributions of spikes and mean frequency of discharge were significantly different for the two populations of corticopetal and corticofugal fibers. The temporal patterns of neuronal dark discharge appeared temporally more dispersed and quantitatively less organized in the efferent cortical path compared to the afferent one. Correspondingly, the mean frequency of discharge appeared higher in the ascending than in the descending tract fibers. These results may be indicative of two functional properties: (1) the integration of a greater number of inputs by the cortical neurons than the lateral geniculate ones, and (2) more

A69-80673

efficient driving of the neurons of the lateral geniculate by the specific afferents

A69-80673

MEASURE OF AN INDIVIDUAL'S ATHLETIC POTENTIAL BY CARDIOPULMONARY RESPONSE TO EXERCISE

Kenneth D Rose (Neb U Health Serv., Div of Med Res., Lincoln)

Medical Times, vol 97 Feb 1969, p 210-218

Am Acad of Orthopedic Surgeons Post-Graduate Course on Sports Med., Oklahoma City, Jul 30, 1968

Grant PHS HE-06204 and Neb. U supported research

It is possible to equate cardiopulmonary fitness with athletic ability. It stands to reason that anyone with good or excellent cardiovascular response most likely possesses other physical capabilities compatible with athletic excellence. It must be added, however, that this statement is more true concerning endurance sports than strength or skill sports. The best cardiovascular fitness tests are treadmill tests to determine maximum aerobic capacity. Their pre-eminence comes from their ease of standardization. When properly applied, maximum aerobic capacity tests bypass most of the artifacts inherent in fitness tests. It should be added, however, that they do have a limitation: this being the motivation factor. In spite of possible artifacts in brachial pulse analysis, exercise and recovery electrocardiography, Q-first heart sound measurements, breath-holding tests, etc., it would be scientifically nearsighted to discount them as research tools for the study of fitness. Electrocardiographic changes, cardiac anatomical variations, bradycardia and increased stroke volume, etc., of the fit endurance athlete probably takes many years to develop, and thus these measures, *per se*, cannot be used in early assessment of athletic capability. Practicality dictates wider use of exercise tests such as Balke's and Cooper's walk-run tests. Prospective studies are needed to equate cardiovascular pulmonary fitness in early life with future athletic prowess. Until further studies become available, physical fitness can really be applied only to demonstrate an already well-known fact, namely, well-trained, capable athletes possess a much better cardiovascular pulmonary system than those of their less fit and untrained counterparts.

A69-80674

VARIABLE PARAMETER HEMODYNAMIC SYSTEMS

Julius Melbin (Pa U Moore School Dept of Bio-Med Eng and School of Vet Med., Comp Cardiovascular Studies Unit Philadelphia)

Medical Research Engineering, vol 7 Fourth quarter 1968 p 17-23 9 refs

Grants PHS HF-11 595 and PHS H-4885

A variable parameter hydraulic flow generator has been developed which is designed to accommodate wide investigative interests. Design data are described. Information is provided on physiological parameters as equivalent features in mechanical systems. The pump is variable over a wide range of outputs and can generate a desired pulse contour. Independent variation of parameters and timing are possible to provide varying stroke volume, stroke rate and flow rate. In addition, means are provided to simulate desired valvular and fluid conditions on both suction and discharge sides of the structure under study. A fluid system is also presented which provides variable viscosity and density.

A69-80675

VISUAL MOVEMENT AND THE BENDING OF PHENOMENAL SPACE

Jacob Goldstein and Charles Wiener (N Y State Family Court, Bur of Mental Health Serv and Board of Educ., New York City) *Journal of General Psychology*, vol 80 Jan 1969, p 3-46 70 refs

Two filmed circular disks oscillating in opposite directions along parallel pathways at uniform physical speeds were used in a study of the relationship between visual movement and the bending of phenomenal space. The variables studied included physical tilt, length of the pathways of oscillation, alterations in the framework (including elimination of the rectangular frame), and the use of geometric patterns and meaningful figures as backgrounds. Phenomenal transformations from two-dimensional to three-dimensional configurations were obtained. The findings are discussed in relation to phenomenal slant, righting effects, phenomenal speed, role of the framework, effect of movement on background, mode of appearance of the disks, the Kinetic Depth Effect, role of symmetry, organizational factors, underlying processes and manifold sectioning. Special emphasis is given to the bending of phenomenal space through movement.

A69-80676

EFFECTS OF PAYOFF AND PROBABILITY ON RECALL OF MULTISYMBOL DISPLAYS

Richard E Christ (Kan State U., Dept of Psychol Manhattan) *Journal of General Psychology*, vol 80 Jan 1969 p 81-92 7 refs

Contract Nonr 3357(06)

This study investigated the effects of differential ratios of stimulus values, cost for omissions, and the relative proportion of stimuli from each value category on the free recall of briefly exposed slides containing randomly selected and positioned letters of the alphabet. Consideration of the results suggests the following conclusions: (a) increases in value ratio lead to a significantly higher proportion of higher valued reports, but the total number of reports while showing a tendency to decrease, remained relatively invariant; (b) cost for omissions produces a slight increase in the number of letters recalled; (c) the relative proportion of letters from a given value category did not affect overall performance; and (d) the percentage of first reports that were high valued were shown to be directly related to event probability but inversely related to chance expectations, the latter finding suggesting that low probability events have value to the subject and of themselves, or at least, that the subject has a bias for reporting these events first. These results were attributed to a selective retrieval from short-term memory.

A69-80677

OSCILLATIONS IN ARTERIAL PH WITH BREATHING IN THE CAT

D M Band, I R Cameron, and S J G Semple (Med School St Thomas's Hosp., Dept of Med London, Great Britain)

Journal of Applied Physiology, vol 26, Mar 1969 p 261-267 18 refs

Med Res Council and Brit Heart Found supported research

Continuous records were made of carotid artery pH *in vivo* in spontaneously breathing and artificially ventilated cats. Each breath induced an oscillation in the arterial pH, the amplitude of which at constant mean pH varied directly with tidal volume and inversely with respiratory rate. The oscillations were seen at respiratory rates of 30 to 35/min even when there was alveolar hypoventilation. With artificial ventilation, an abrupt increase in the tidal volume caused an initial increase in the amplitude of the oscillations, but the amplitude decreased as the mean pH rose. The converse occurred when tidal volume was abruptly decreased. Factors other than tidal volume and rate which may be responsible for

this observation are discussed. Rebreathing or carbonic anhydrase inhibition diminished or abolished the oscillations. The time relationship between the respiratory cycle and the pH oscillations was examined in five spontaneously breathing cats. It was found to vary predictably with the respiratory rate and the circulation time from lungs to electrode. The possible importance of this in the control of breathing is discussed.

A69-80678

EFFECT OF DIFFERENT METHODS OF CO₂ ADMINISTRATION ON OSCILLATIONS OF ARTERIAL PH IN THE CAT

D M Band I R Cameron and S J G Semple (Med School St Thomas's Hosp. Dept of Med, London Great Britain)

Journal of Applied Physiology, vol 26, Mar 1969, p 268-273
12 refs

Med Res Council and Brit Heart Found supported research

Changes in the breath-by-breath oscillations in carotid artery pH (*in vivo*) induced by various forms of CO₂ administration are described. All changes are expressed as percentages of air-breathing control values. Continuous CO₂ administration by raising the inspired CO₂ concentration consistently reduced the amplitude of the oscillations (31 to 62%) the maximum rate of change of pH ($\Delta pH/\Delta t$) was also reduced (32 to 76%). Alternate breaths of 15 or 8% CO₂ and air consistently increased the amplitude of the oscillations (130 to 610%) and $\Delta pH/\Delta t$ (90 to 430%) the frequency of these oscillations was half the respiratory rate. Intravenous CO₂ was administered by an infusion of blood, equilibrated with 100% CO₂ at a rate of 6 to 8 ml/min which produced a drop in mean arterial pH of 0.02 to 0.04 unit. The amplitude of the pH oscillations and $\Delta pH/\Delta t$ were consistently increased. An artificial increase in the respiratory dead space (tube breathing) led to a decrease in the amplitude of the oscillations as with continuous CO₂ administration. However, tube breathing altered the shape of the oscillations as compared with the control or with continuous CO₂ administration. The results are discussed in relation to experiments designed to investigate the effect of oscillations in PaCO₂ on respiration.

A69-80679

ENERGY COST OF PILOTING FIXED- AND ROTARY-WING AIRCRAFT

D E Littell and R J T Joy (U.S. Army Aeromed Res Unit Fort Rucker, Ala and U.S. Army Res Inst of Environ Med, Natick Mass.)

Journal of Applied Physiology, vol 26, Mar 1969, p 282-285
11 refs

The energy cost of piloting three US Army helicopters (light, utility and medium) and one utility fixed-wing aircraft was investigated. Energy expenditure was calculated from expired minute volume and expired air oxygen content measured during the basal state and in normal flight conditions. Data were collected on a total of 16 pilots, five of whom flew all three helicopters. All of the helicopter pilots were experienced test pilots. The data indicated that, for these pilots and flying conditions studied (level flight in good weather) and aircraft, the energy cost must be classed as very light work averaging 1.79 kcal/min. The energy cost of flying the fixed-wing aircraft by less experienced pilots was similar to previously reported energy expenditures for such aircraft. The data were segregated to separate measurements made at altitude from those made during flight in close proximity to the ground (take off, hover, etc.). In three of the four aircraft the pilot's energy expenditure was greater when ground contact was possible.

A69-80680

EXTERNAL WORK IN LEVEL WALKING

Jerome W Gersten, William Orr, Alan W Sexton and Danielle Okin (Colo., U. School of Med. Dept of Phys Med and Rehabil Denver)

Journal of Applied Physiology, vol 26, Mar 1969, p 286-289
Grant HEW RT-10

External work while men were walking was computed from measurement of triaxial acceleration components (vertical, lateral, anterior-posterior). The data were digitized and punched on cards in a form suitable for use on a digital computer. The three accelerometers were mounted at the level of the second sacral vertebra and signals were transmitted to a receiving station. Ten complete step cycles were averaged for each walk. Test-retest reliability was high when the accelerometers were kept in position between walks. Values of external work were similar to those obtained previously though slightly higher because shifts of the center of gravity during locomotion were ignored while lateral displacements, though small, were included in this study. The method described allows for considerable flexibility in experimental procedure, reliability, rapid handling of data and accuracy when the velocity of walking is less than five km/hr.

A69-80681

EXERCISE-TEMPERATURE REGULATION IN MAN DURING ACUTE EXPOSURE TO SIMULATED ALTITUDE

J E Greenleaf, Carol J Greenleaf, D H Card and Bengt Saltin (Gymnastik-och idrottshogskolan, Dept of Physiol, Stockholm, Sweden)

Journal of Applied Physiology, vol 26, Mar 1969, p 290-296
18 refs

United Life Insurance Co and Swed Sport Federation supported research

Esophageal, rectal and skin temperatures were measured in three trained men during a one-hr constant submaximal workload at 350-, 2,000- and 4,000-m simulated altitude. Since the average maximal O₂ uptake decreased 11.3 and 32% at 2,000 and 4,000 m respectively compared with sea-level values, the relative workload progressively increased. The purpose was to determine whether some property of the relative vs the absolute workload influenced the setting of equilibrium core temperatures during exercise. Results indicated close agreement between esophageal and rectal temperatures ($R = 0.89$) although rectal averaged 0.13°C higher. There was no appreciable difference in the exercise equilibrium core temperatures with a constant heat input at the three altitudes with relative O₂ uptakes between 46 and 66%. Thus the exercise-temperature-regulating mechanism appears unaffected by P_{IO₂} changes between 149 and 87 mm Hg during acute exposures. Average tissue conductance decreased from 32.2 kcal/m² × hr-°C at 350 m to 21.7 ($P < 0.05$) at 4,000 m, and sweat rate progressively increased from 222 to 257 g/m² × hr ($P < 0.025$) with increasing altitude. It was concluded that the setting of the equilibrium level of exercise core temperature was related to the absolute load and was associated with changes in the rate of sweating and tissue conductance. The latter two variables appear related to the degree of stress imposed, i.e. to the relative workload.

A69-80682

ENERGY EXPENDITURE IN WORK PREDICTED FROM HEART RATE AND PULMONARY VENTILATION

S R Datta and N L Ramanathan (All-India Inst of Hyg and Public Health, Ind Health Res Unit Calcutta, India)

Journal of Applied Physiology, vol 26, Mar 1969, p 297-302
19 refs

All-India Inst of Hyg and Public Health supported research

A69-80683

From data on energy expenditure (E) pulmonary ventilation (PV) and heart rate (HR) of nine volunteers carrying loads upstairs highly significant regression relations for E with PV and HR were obtained. The regressions had correlation constants of 0.90 and 0.88 respectively indicating that both parameters yield acceptable estimates of the energy expenditure. To resolve the question of the relative merit of PV and HR for predicting E a test on four subjects performing a step test with a load was made. Statistically the energy cost computed from PV was found to be closer to the observed values, the slope between the two values being unity. Essentially similar regressions between PV and E for different occupations in India were obtained from values reported in literature. A simple relation $E = 0.210 PV$ fitted data from different sources satisfactorily within allowable limits. Therefore it was inferred that PV is relatively more suitable for assessing the human energy cost of homogeneous groups with sufficient precision for field and industrial studies.

A69-80683

RESPIRATORY GAS EXCHANGE IN EXERCISE DURING HELIUM-OXYGEN BREATHING

T M Murphy, W H Clark, I P B Buckingham and W A Young (St Paul's Clin Invest Unit, Vancouver Brit Columbia Canada). *Journal of Applied Physiology*, vol 26 Mar 1969 p 303-307 12 refs

Grant DRB 9310-108

Six subjects were exercised on a treadmill while breathing air or 21% oxygen in helium through a low-resistance valve. Ventilation, O_2 uptake and CO_2 output during He- O_2 breathing were compared with values for air breathing at each workload. The ventilations and CO_2 outputs were identical for the two gases. Though the O_2 uptakes were identical at low workloads, the value for He- O_2 fell abruptly below that for air as the exercise increased. This appears to be due to the development of turbulent flow in the airways at lower ventilations during air breathing than during He- O_2 breathing because of the lower density of the latter gas and a corresponding effect on the oxygen cost of breathing. Arterialized capillary blood taken at a high workload showed a P_{CO_2} four mm lower on He- O_2 than on air, establishing the presence of hyperventilation. The CO_2 production must therefore be reduced along with the O_2 consumption although no corresponding fall in ventilation occurs.

A69-80684

MAXIMUM EXPIRATORY FLOW-VOLUME CURVES AND AIRWAY CONDUCTANCE IN CHILDREN AND ADOLESCENTS

A Zapletal, E K Motoyama, K P Van de Woestijne, V R Hunt and A Bouhuys (John B Pierce Found Lab and Yale U School of Med New Haven Conn).

Journal of Applied Physiology, vol 26, Mar 1969, p 308-316 36 refs

Grants PHS AP-00463, PHS HD-00989, and CHA 356

Measurements were made of the maximum expiratory flow rates (V_{max}), airway conductance (Gaw) and lung volumes (TLC, VC, FRC, RV, $FEV_{1.0}$) in healthy subjects, six to 18 yr old. TLC, VC and $FEV_{1.0}$ increase progressively more (per unit height increase) as growth proceeds, in particular in boys. V_{max} and Gaw at different lung volumes, are closely related to TLC; the ratios V_{max}/TLC and Gaw/TLC are independent of height. This finding may allow evaluation of lung mechanics in children with respiratory disease independent of the effect of growth. Approximate average data at 50% VC are: V_{max} 1 TLC/sec, Gaw 0.1 TLC/sec/cm

H_2O Conductance of the upstream airway segment ($G_{us} = V_{max}/P_{st(1)}$) increases as lung volume decreases as expected if convective accelerative pressure losses are important in small airways in children. The relations between TLC on the one hand and V_{max} , Gaw and G_{us} on the other hand are consistent with the hypothesis that the lungs and airways grow isotropically between ages six and 18 approximately.

A69-80685

DERMAL BLOOD FLOW IN THE RESTING ARM DURING PROLONGED LEG EXERCISE

Eliezer Kamen and Harwood S Belding (Pittsburgh U Graduate School of Public Health, Dept of Occupational Health Pa).

Journal of Applied Physiology, vol 26 Mar 1969 p 317-320 14 refs

Contract DA-49-193-MD-2580 and Grant NIH UI-00400

A water-filled calorimeter at constant temperature of 40.6° C was used to measure heat uptake by the forearm and hand while exercising on a bicycle ergometer in a room at 24° C. The subjects trained athletes rested for one hr, pedaled during a second hr at an oxygen consumption level of 600 ml/min per m² and rested a third hr. Values for effective dermal blood flow (BFe) were calculated from the heat uptake and the temperature gradient between skin and body core. During the first ten min of exercise BFe of hand fell markedly while that of forearm did not change. Since brachial blood pressure is increased at this time, the results are taken as evidence of dermal vasoconstriction for both limb segments. This occurred despite high local skin temperature suggesting preponderance of central local factors in control. After several min of exercise BFe in both hand and forearm gradually increased, to 20 to 50% above control levels indicating a secondary release of vasoconstriction; the increase seemingly is appropriate for promoting thermal balance.

A69-80686

ELASTIC BEHAVIOR OF THE LUNG IN PATIENTS WITH AIRWAY OBSTRUCTION

K E Finucane and H J H Colebatch (New South Wales U, School of Med and Prince Henry Hosp, Dept of Med Sydney Australia).

Journal of Applied Physiology, vol 26 Mar 1969 p 330-338 36 refs

The static volume-pressure (V-P) characteristics of the lungs of 10 healthy subjects, 10 patients with emphysema and 10 patients with asthma were measured during interrupted expiration. The two groups of patients had similar reductions in the forced expiratory volume at one sec. The elastic retraction of the lung was least the slope of the V-P curve near resting lung volume (compliance) was greatest in emphysema. In asthma compliance was similar to that in healthy subjects but elastic retraction was decreased. In three patients restudied during remission of asthma a decreased elastic retraction persisted and compliance increased. Therefore the static deflation V-P characteristics although significantly different in the asthma and emphysema groups may not differentiate between these diseases in individual patients. In emphysema the V-P characteristics appear appropriate for the destruction of lung tissue. In asthma the reduced elastic retraction could not be explained by airway closure alone and probably involves tissue stress-relaxation. It was concluded that disruption of the pulmonary fiber network is not the only mechanism whereby tissue elastic retraction is reduced.

A69-80687

EQUATIONS AND NOMOGRAMS FOR BLOOD-OXYGEN DISSOCIATION CURVES IN ADULT AND FETAL MACAQUES

Miles J Novy Julian T Parer, and Richard E Behrman (Ore , U Med School, Ore Reg Primate Res Center, Div of Perinatal Biol Portland and Wash U , School of Med Dept of Obstet and Gynecol Seattle)

Journal of Applied Physiology, vol 26, Mar 1969 p 339-345 27 refs

N Y Acad of Sci , Conf , New York City, Sep 28, 1967

Grants PHS FR 00166, PHS HD 02757, PHS HD 01901 and PHS FR 00163

The relationships of P_{O_2} and pH to percentage saturation of hemoglobin with oxygen were determined in blood from 25 adults and 15 fetuses from three species of macaque monkeys. Empirically derived equations were used to generate nomograms for convenience in obtaining the third variable when only two variables were known. The oxygen tension at 50% saturation of hemoglobin (P_{50}) expressed at pH 7.40 and 38° C is 32.0 mm Hg for blood from the adult *Macaca mulatta*. Under the same conditions, the P_{50} of blood from the adult *Macaca irus* is 32.4 mm Hg from the adult *Macaca nemestrina* 32.5 mm Hg. The corresponding values for fetal blood from the rhesus and cynomolgus monkeys are 19.2 and 18.8 mm Hg, respectively. The data indicate no significant differences in the adult blood-oxyhemoglobin dissociation curves of the three species. The magnitude of the Bohr effect in adult and fetal monkey blood is similar. However, adult and fetal curves differed significantly from each other. Neither pregnancy, sex, nor the presence of two hemoglobin types had any apparent effects on the oxygen-binding properties of blood.

A69-80688 PULMONARY MICROCIRCULATORY OBSERVATIONS IN VIVO UNDER PHYSIOLOGICAL CONDITIONS

Wiltz W Wagner Jr (Colo., U Med Center Cardiovascular Pulmonary Lab., Denver)

Journal of Applied Physiology, vol 26 Mar 1969, p 375-377 5 refs

Grant NSF GB-5080 and Contract DADA 17-68-C-8071

A technique is described for making microscopic observations at oil immersion magnifications of the surface of the dog lung *in vivo* by implanting a thoracic window. Cardiorespiratory movement of the observation field is arrested by gentle radial traction applied by a system of suction manifolds which encircle the window. Alveolar diameters are increased an average of 3% by the traction. Because observations can be made immediately following surgery it is possible to study the pulmonary microcirculation while the animal is being maintained in a normal physiological condition as indicated by blood-gas, blood pressure, and cardiac output measurements.

A69-80689 A PRESSURE PLETHYSMOGRAPH WITH A PNEUMATIC DIFFERENTIATOR FOR PULMONARY CAPILLARY FLOW MEASUREMENTS

Nicholas B Karatzas John A Clements and Malcolm B McIlroy (Calif., U., San Francisco Med Center Cardiovascular Res Inst San Francisco)

Journal of Applied Physiology vol 26 Mar 1969, p 385-386 6 refs

Grant NHI HE-06285

A design for a pneumatic differentiating circuit for use with a pressure body plethysmograph is given. It consists of a glass capillary tube acting as a pneumatic resistance in the line to one side of a differential pressure transducer connected to the body plethysmograph. The other side of the transducer is directly connected

to the plethysmograph. Resistance values are selected to give a frequency response flat to about 10 cycle/sec and a satisfactory noise-to-signal ratio when used for measurements of pulmonary capillary blood flow in dogs.

A69-80690 RESULTS OF A SURVEY CONDUCTED AMONG THE FLYING PERSONNEL ON INSTRUMENT PANEL ILLUMINATION [RESULTATS D'UNE ENQUETE AUPRES DU PERSONNEL NAVIGANT CONCERNANT L'ECLAIRAGE DES TABLEAUX DE BORD]

A Mercier, G Perdriel J Chevaleraud and J C Hache (Centre Principal d'Expertise Med du Personnel Navigant Paris, France) *Revue de Médecine Aéronautique et Spatiale*, vol 7, no 27 1968, p 147-151 In French

An investigation was conducted among military (20 to 49 yr) and civil (20 to 59 yr) pilots on the preferred type of instrument panel illumination during the different phases of flight. The survey included the pilot age, flight time, the lighting type chosen during taxiing, takeoff, cruising and landing, the adequacy or insufficiency of the light intensity, and the possible discomfort caused by the reflection of the light on the cockpit walls. The answers received were analyzed statistically. They showed a dislike for the red light which developed with the physiological aging of the pilots. The majority of the pilots were satisfied with the intensity of the light in use and the white or ultraviolet light was found to produce the greatest amount of reflection.

A69-80691 EFFICIENCY OF VISUAL FUNCTIONS IN RELATION TO THE COLOR OF LIGHT ILLUMINATING THE INSTRUMENT PANEL [L'EFFICACITE DES FONCTIONS VISUELLES EN FONCTION DE LA COULEUR DE L'ECLAIRAGE DES INSTRUMENTS DE BORD]

A Mercier, G Perdriel and J Chevaleraud (Centre Principal d'Expertise Med du Personnel Navigant, Paris France)

Revue de Médecine Aéronautique et Spatiale, vol 7 no 27 1968 p 152-153 In French

A brief review was presented of the latest improvements in instrument panel illumination systems, and the advantages and disadvantages of red and white lighting were discussed in relation to the visual and operational conditions.

A69-80692 OCCURRENCE OF ASTHMA AMONG THE ARMED FORCES FLYING PERSONNEL [NOTRE EXPERIENCE DE L'ASTHME DANS LE PERSONNEL NAVIGANT DES FORCES ARMÉES]

J Droniou A Fabre R Pannier, and L Tabusse (Serv de Méd Aéron Hôp d'Instruction des Armées Versailles France)

Revue de Médecine Aéronautique et Spatiale vol 7 no 27 1968 p 155-161 In French

The physiopathology and clinical aspects of asthma and the effect of flying on the disease were discussed. Flying did not seem to elicit asthma attacks and an improvement was often observed during flight. An asthmatic condition did not preclude flying activities, however the occurrence of an attack of asthma in the pilot could present a serious problem for the flight safety. The circumstances leading to the discovery of 22 cases of asthma among flying personnel and the means to detect the sickness were reviewed. In the course of personnel selection any candidate presenting asthma symptoms should be eliminated. Candidates having hereditary asthmatic antecedents should undergo a systematic functional pulmonary exploration. This test should be added to the batteries of candidate selection tests. In flying personnel suffering

A69-80693

from asthma factors such as age, speciality clinical data, and the results of treatment of the disease should be taken into account before temporary or permanent grounding

A69-80693

CEREBRAL CIRCULATION DURING LONGITUDINAL ACCELERATION [CIRCULATION CERVEALE SOUS ACCELERATION LONGITUDINALE]

Demange and Salvagnac

Revue de Médecine Aéronautique et Spatiale, vol 7, no 27, 1968 p 162-165 In French

Rheoplethysmography was used in recording the reaction time and the cerebral blood flow of 31 subjects exposed to longitudinal acceleration in the human centrifuge regulated to reach five g in less than ten sec. The findings were presented and discussed. The cerebral rheoplethysmographic recordings of subjects exposed to various acceleration stresses in the human centrifuge provided objective and reliable data and would be a useful tool in flying personnel selection and examinations.

A69-80694

ADVANTAGE OF A SIMULTANEOUS RECORDING OF THE ORAL PRESSURE AND CARDIAC RHYTHM IN THE FLACK TEST [INTERET D'UNE DOUBLE INSCRIPTION SIMULTANEE DE LA PRESSION BUCCALE ET DU RYTHME CARDIAQUE DANS LE TEST DE FLACK]

P. Harichaux, M. Delmaire, M. Taupin, and J.-P. Denoeux

Revue de Médecine Aéronautique et Spatiale, vol 7 no 27 1968 p 167-170 20 refs In French

The results were presented of a cardio-respiratory investigation carried out on 48 students in physical education (38 men and 10 women). Spirometric and thoracic biometry test and electrocardiographic (ECG) recordings were made. The simultaneous registration of the oral pressure and of the ECG during the Flack test could be carried out with the use of an electromanometer and a polygraphic recorder with amplifiers. An adequate recording speed (10 mm/sec) allowed the interpretation of the ECG before, during and after expiratory exertion in high pressure. The data obtained could also be read at a later time and provided evidence in the interpretation of the Flack test.

A69-80695

MAGNETIC FIELDS AND BIOLOGY [CHAMPS MAGNETIQUES ET BIOLOGIE]

L. Miro

Revue de Médecine Aéronautique et Spatiale, vol 7 no 27, 1968 p 171-172 In French

A short review was given of the latest developments and results of investigations on the effect of magnetic fields on living beings. Included were visual neuropsychiatric and physiologic responses, tissue and bacterial culture studies, and the radioprotective action of magnetic fields.

A69-80696

EFFECT OF WHITE OR RED LIGHT ILLUMINATION OF THE INSTRUMENT PANEL ON THE DARK ADAPTATION INDEX [LES EFFETS DE L'ECLAIRAGE EN BLANC OU EN ROUGE DES INSTRUMENTS DE BORD SUR L'INDEX D'ADAPTATION NOCTURNE]

T. C. D. Whiteside (R.A.F. Inst. of Aviation Med. Farnborough, Great Britain) and A. Mercier (Centre de Vision Nocturne de l'Aviation Mil. Franc. Tours, France)

Revue de Médecine Aéronautique et Spatiale, vol 7 no 27 1968 p 173-175 In French

A series of experiments were carried out on 36 subjects (18 to 30 yr old) to study the variations in the dark adaptation threshold when the instrument panels were illuminated with red or white light. The light intensities used were similar to those used by pilots during night flying. Three levels of luminosity were used during the tests for each color of light. The highest threshold level reached after each period of instrument reading was measured on the dark adaptation curve. A statistical study of the results showed a smaller loss of dark adaptation after the reading of instrument panels illuminated with white light than red light. The comparison of these results to a given level of luminance or readability showed that the difference in adaptation after reading white or red illuminated panels decreased with the level of brightness of the panel. At the lowest level used in the tests the difference in the threshold was 0.15 log U.U.L. It was concluded that with the threshold values being very close the most important factor was the pilot's comfort. A combination of red illumination associated with the projection of white light when necessary presented a satisfactory solution.

A69-80697

THE DIFFICULTIES AND TEACHINGS OF A MEDICAL INVESTIGATION AFTER AN AERIAL ACCIDENT [DIFFICULTES ET ENSEIGNEMENTS D'UNE ENQUETE MEDICALE APRES ACCIDENT AERIEN]

M. Pingannaud, C. Nogues, and D. Didot

Revue de Médecine Aéronautique et Spatiale, vol 7 no 27 1968 p 176-179 In French

The mid-air collision between two aircraft with the pilots ejecting safely was investigated. The investigating board was able to determine the circumstances of the accident and established that the collapse of one of the pilots affected by hypoxia caused the crash. It was unable to find concrete evidence on the origin of the collapse. The hypothesis that the pilot was overcome by hypoxia induced by an accidental disconnection of the oxygen tubing or a leakage of oxygen due to a faulty connection was put forward. Additional research to verify this seemed necessary. After a series of tests including hypoxia tolerance, reaction to high altitude environments, and psychologic examination it was concluded that the initial cause a malfunction of the breathing apparatus. Two other factors were considered: (1) a loss of cabin pressurization and (2) an intellectual impairment which could occur in the most experienced pilots were considered.

A69-80698

LACERATION AND DETACHMENT OF THE RETINA IN JET PILOTS [DECHIRURES RETINIENNES ET DECOLLEMENT CHEZ LES PILOTES DE REACTEUR]

J. L. Gaudin and J. P. Gerhard

Revue de Médecine Aéronautique et Spatiale, vol 7 no 27, 1968, p 189-190 6 refs In French

Two case histories of laceration and detachment of the retina in jet pilots were presented. In both cases the pilots had no objective or subjective symptomatology. The rare occurrence of such injuries among the flying population and the lack of pertinent literature on the subject emphasized the need of research and investigation on the effect of acceleration in the genesis of retinal laceration and detachment.

A69-80699

ARCUS CORNEAE A SYMPTOM OF ATHEROMATOSIS AMONG THE FLYING PERSONNEL [L'ARC CORNEEN SIGNE EVOCATEUR D'ATHEROMATOSE CHEZ LES MEMBRES DU PERSONNEL NAVIGANT]

G Perdiel, J-L Gaudin J Chevaleraud H Chesne J Charrieau Altmann and Dubodat (Centre Principal d'Expertise Méd du Personnel Navigant Serv d'Ophtalmol et des Labs de Chim Paris and Centre d'Expertise Méd du Personnel Navigant Strasbourg France)

Revue de Médecine Aéronautique et Spatiale, vol 7 no 27 1968 p 191-192 In French

The high ratio (6 56%) of occurrences of arcus senilis among the flying population between 20 and 40 yr of age revealed by the analysis of 2,020 medical files initiated an investigation to determine the causal factor of the disease A relationship was found between the presence of the arcus senilis and the biological anomalies usually encountered in atheromatosis The causes of these modifications were reviewed and the advantage of systematic search of the arcus senilis for the early detection of atheromatosis was stressed

A69-80700

REMINISCENCE EFFECTS ON INTER- AND INTRA-INDIVIDUAL DIFFERENCES IN PURSUIT ROTOR PERFORMANCE

Richard B Alderman (Alberta U Edmonton, Canada)

Research Quarterly, vol 39 Oct 1968 p 423-427 15 refs

Sixty male college students were given 60 15-sec trials on the pursuit rotor learning task Practice was interrupted halfway through learning by a 10-min rest period in order to investigate whether or not a reminiscence effect would influence inter-individual differences and intra-individual variation in performance Results were consistent with previous experimentation in that inter-individual differences increased as a result of both practice and the interpolated rest period A corresponding effect on intra-individual variation was barely noticeable

A69-80701

AGE AND SEX DIFFERENCES IN LEARNING AND PERFORMANCE OF AN ARM SPEED MOTOR TASK

Richard B Alderman (Alberta, U, Edmonton Canada)

Research Quarterly, vol 39 Oct 1968 p 428-431 7 refs

Initial performance, final performance, and the amount of learning in 50 trials of the rho test motor performance task were obtained on 120 boys and girls aged 10 and 14 Initial and final performance showed significant age sex and age w/i sex differences The amount of learning showed no differences

A69-80702

CONTRIBUTIVE COMPONENTS IN THE VERTICAL JUMP

Blauer L Bangerter (Brigham Young U, Provo Utah)

Research Quarterly, vol 39 Oct 1968 p 432-436 15 refs

The degree of contribution to performance of the vertical jump by leg components plantar flexors knee extensors and hip extensors was determined experimentally and tested by analysis of covariance One control and four experimental groups from 100 college men at Brigham Young University were randomly assigned to varying muscle strengthening programs for eight wk Initial and final vertical jump tests and strength measures were administered Gains in the vertical jump significant beyond the .05 level were registered by experimental groups which strengthened knee and/or hip extensors Control and plantar flexor strengthening groups did not register significant jump gains Each experimental group registered significant isotonic strength gains in the programed muscle groups

A69-80703

EFFECTS OF ISOMETRIC WORK ON HEART RATE, BLOOD PRESSURE, AND NET OXYGEN COST

Robert L Bartels Edward L Fox Richard W Bowers and Edwin P Hiatt (Ohio State U, Exercise Physiol Res Lab, Columbus) *Research Quarterly*, vol 39 Oct 1968, p 437-442 12 refs NASA supported research

A study was made on the effects of a 10-sec isometric exercise which involved much of the large musculature upon the heart-rate blood pressure, and net oxygen cost Six subjects exercised in a semireclining fixed position against a Medart spring dynamometer Each subject pulled to 60% of his previously determined maximum effort Heart rate showed a slight increase during exercise followed by a sharp rise in the few seconds following exercise This was followed by a drop almost to the resting level within 20 to 30 sec following exercise Systolic pressure rose following exercise and was highest in the period immediately following exercise then dropped slowly to resting levels within two and one-half min Oxygen consumption varied widely both between subjects and between experiments in the same subject

A69-80704

MOTOR PERFORMANCE UNDER STRESS

Albert V Carron (Alberta U, Edmonton Canada)

Research Quarterly, vol 39 Oct 1968, p 463-469 21 refs

One hundred and twenty freshmen males selected on the basis of their extreme scores on the Taylor manifest anxiety scale served as subjects Sixty high-anxious and 60 low-anxious subjects were assigned randomly to one of three equal groups control, stress-early and stress-late The subjects were given 35 20-sec practice trials a day on the stabilometer for two days An electric shock stressor was given to the stress-early subjects on trials four to six and to the stress-late subjects on trials 65 to 67 The results support the following conclusions The early shock had a differential effect upon the improvements in performance of the high-anxious and low-anxious subjects The low-anxious stress-early group was not affected by the stress but the performance improvement of the high anxious stress-early group was significantly inferior to that of all other groups during the stress period Stress introduced late resulted in a significant decrement in amount of performance improvement for both high-anxious and low-anxious subjects Upon removal of the shock stressor both high-anxious and low-anxious subjects significantly improved in performance thereby achieving their prestress levels of performance

A69-80705

EFFECTS OF A SINGLE BIODOSE OF ULTRAVIOLET RADIATION UPON THE SPEED OF COLLEGE WOMEN

Billye A Cheatum (Tex Woman s U, Denton)

Research Quarterly, vol 39 Oct 1968 p 482-485 18 refs

The present study investigated the effects of a single suberythemic biodose on the speed of college women running the 30-yd dash Three trials were given on two consecutive days one hr after radiation A double blind testing procedure was followed Ultraviolet and incandescent radiation was alternated Time was automatically recorded to .01 sec A significant difference occurred in the third trial under the experimental condition All other data favored the ultraviolet treatment but not significantly It was concluded that a single biodose of ultraviolet radiation below threshold levels aids the speed of college women on the 30-yd dash

A69-80706

ORTHOGONAL FACTORS OF CARDIAC INTERVALS AND THEIR RESPONSE TO STRESS

A69-80707

B Don Franks and T K Cureton Jr (Ill. U., Urbana)
Research Quarterly, vol 39 Oct 1968, p 524-532 24 refs

Left ventricular intervals were determined on 61 middle-aged men in basal condition, during and after mental concentration and after submaximal exercise. Four orthogonal factors were determined from a factor analysis, using varimax rotation. The tests with the highest loadings for the four factors were mechanical systole diastole isovolumetric contraction period, and electromechanical lag. The effects of mental arithmetic and a submaximal ergometer ride on these intervals were determined by an analysis of variance and Duncan's multiple range. The mental arithmetic caused significant reductions in diastole mechanical systole electromechanical lag and isovolumetric contraction period. Exercise caused significant reductions in mechanical systole isovolumetric contraction period diastole, and electromechanical lag.

A69-80707

TRANSFER OF MOVEMENT COMPONENTS IN A MOTOR LEARNING TASK

Kenneth C Lersten (Southern Calif. U., Los Angeles)
Research Quarterly, vol 39 Oct 1968 p 575-581 10 refs

Transfer of motor skill was studied using a simple apparatus which consists of performing a circular and then a tangential linear movement at maximal speed and in a continuous motion. Four groups of 30 right-handed university students were tested. Three experimental groups were distinguished as having 20 trials of extra or inserted practice on two movement components (circular and linear). Transfer from this initial practice period to the total task (both movement components together) could then be assessed. One group served as a control by practicing only the total task. Initially, there was shown to be little or no correlation between the two movement components ($r = .17-.14$). Learning was substantial during practice in both components but the amount was twice as large in the case of the circular component (.068 vs .034 sec). It was shown that transfer of motor skill was small and occurred to a significant degree only in the circular component (6.7%).

A69-80708

SHORT-TERM MEMORY TRACE DECAY IN KINESTHETICALLY MONITORED FORCE REPRODUCTION

Mary Lou Norrie (Calif. U., Berkeley)
Research Quarterly, vol 39 Oct 1968 p 640-646 7 refs

The decay of the memory trace for intervals of one-half min, one and one-half min, and four min between the test stimulus and the reproduction trial was studied for a force reproduction task in which the amount of movement was .13 in. The subject pushed against a handle attached to the top of a steel bar with the preferred hand. Sixty-three women volunteers from college physical education classes performed the experiment. For Part A all subjects first had four trials in which the reproduction was immediate (the control condition). Then they were divided randomly into three subgroups of 21, and each subgroup was assigned to one of the three retention intervals (experimental conditions) for four more trials. In Part B the whole experiment was repeated. For both absolute and algebraic error analysis of covariance indicated no significant differences at the .05 level among the experimental conditions. Also, no significant differences were found comparing a condition in Part A with its respective condition in Part B. While there were no significant differences between control and experimental conditions for absolute error, significant differences were found for algebraic error. The algebraic error changed from considerable overestimation upon immediate reproduction to only slight overestimation after a one-half min retention interval.

A69-80709

RETENTION OF PERCEPTUAL MOTOR SKILL: AN ANALYSIS OF NEW METHODS

Richard S Rivenes and Martha M Mawhinney (Calif. State Coll., Hayward)
Research Quarterly, vol 39 Oct 1968 p 684-689 8 refs

New methods of determining the amount and type of forgetting pioneered by Bilodeau, Sulzer, and Levy were applied to gross perceptual motor skill retention. The changing interdependencies in time of the learned response, recalled knowledge of results after an interpolated rest interval (KR_i), and postrest performance were studied. No evidence of forgetting occurred except for KR_i , which deteriorated in accuracy over a 21 to 23 day rest interval. Limitations of the new paradigm were discussed.

A69-80710

A COMPARISON OF THE EFFECTS OF PHYSICAL AND MENTAL PRACTICE IN LEARNING A MOTOR SKILL

Richard J Stebbins (Ind. State U., Terre Haute)
Research Quarterly, vol 39, Oct 1968 p 714-720 15 refs

This study sought to determine the relative effectiveness of mental and physical practice upon the learning of a selected motor skill, and the possible differential effects of mental practice during different stages of the learning period. Ninety-three male volunteers were used as subjects. They were randomly assigned to the following five treatment conditions: control, mental practice, physical practice, mental-physical practice, and physical-mental practice. Practice consisted of throwing rubber balls at a target from a distance of 15 ft. The practice periods lasted for 18 days. Initial and final tests were administered to determine the increase in skill. Data, which consisted of gain scores, were analyzed using analysis of variance. The results indicated that the only significant improvement occurred in the combination-type treatment conditions. Trend analysis was used to evaluate the changes in the daily practice scores. The results showed that either mental or physical practice was equally effective during the first half of the skill development period.

A69-80711

REACTION AND RESPONSE TIMES OF INDIVIDUALS REACTING TO AUDITORY, VISUAL, AND TACTILE STIMULI

Thomas P Colgate (Chadron State Coll., Neb.)
Research Quarterly, vol 39 Oct 1968 p 783-784

Fifty students from physical education skills classes were employed in an investigation concerned with the variation in reaction and response times of individuals subjected to visual, auditory, and tactile stimuli when the subjects did not know which stimulus they would receive. For both speed of reaction and speed of response, the group means were lower when the subject responded to the auditory stimulus than when he responded to the visual or the electroshock stimulus. Speed of reaction and speed of response were faster when the subjects responded to the visual stimulus than when they responded to the electroshock stimulus.

A69-80712

RELATIONSHIP AMONG SELECTED TESTS OF EXPLOSIVE LEG STRENGTH AND POWER

David L Costill, S J Miller, W C Myers, F M Kehoe, and W M Hoffman (Ball State U., Muncie, Ind.)
Research Quarterly, vol 39 Oct 1968 p 785-787 7 refs

The vertical jump, standing broad jump, 40-yd dash and the squat weight lift were used to demonstrate the relationship which exists among selected tests of explosive leg strength and

power A test method of maximal anaerobic power and maximal vertical velocity was used to measure the power production of the legs The relationships obtained were significant ($p > .005$) but lower than expected The squat lift was the only test item which was significantly related to anaerobic power It was possible to conclude that anaerobic power is significantly related to dynamic leg strength as measured by the squat lift and body weight On the other hand, vertical velocity is related to speed (40-yd dash) but only moderately influenced by explosive leg strength (vertical jump and standing broad jump)

A69-80713

CHANGES IN COMPOSITION PATTERNS OF BASIC PROTEINS IN CHLORELLA CELLS DURING THEIR LIFE CYCLE

Tamotsu Kanazawa and Kimiko Kanazawa (Tokugawa Inst for Biol Res Mejiro, Tokyo, Japan)

Plant and Cell Physiology, vol 9, Dec 1968, p 701-708 13 refs

Changes in the composition pattern of acid soluble basic proteins in *Chlorella* cells during their life cycle were studied using various methods of fractionation, i.e extraction chromatography on CM-Sephadex column and electrophoresis on polyacrylamide gel, etc The content of basic proteins was of the order of 1 to 2.5% of the dry weight of cells and showed a maximum at the D stage and a minimum at the formative stages (L_2 L_3) The change was due to basic proteins (I-HCl) which were insoluble in 0.14 M NaCl and were non-elutable with 2 M NaCl from CM-Sephadex The 0.14 M NaCl soluble basic protein content remained almost constant throughout the life cycle The I-HCl fraction in question showed 20 bands and shoulders in electrophoresis on polyacrylamide gels Some components showed remarkable changes in their relative quantities during the life cycle, while others exhibited relatively little change Preliminary fractionation experiments of subcellular components by a non-aqueous method showed that the basic proteins showing marked changes in their relative amounts were present in a nucleus-rich fraction, and those exhibiting little change were found in a chloroplast-rich fraction except one main component which showed characteristic behavior

A69-80714

THE EFFECTS OF EXERCISE ON ORGAN AND CELLULAR DEVELOPMENT IN RATS

Colin M Bloor Arthur S Leon, and Stanislaw Pasyk (Walter Reed Army Inst of Res Dept of Cardiorespirat Diseases Washington D C)

Laboratory Investigation, vol 19, Dec 1968 p 675-680 34 refs

Am Assn of Pathol and Bacteriol, 65th Ann Meeting, Chicago, Mar 1-3, 1968

Grant PHS 2 FO5 TW 1142-02

The purpose of this study was to determine organ and cellular development in chronically exercised animals and to compare these results with changes observed in animals residing in a hypoxic environment The study comprised an investigation of organ and cellular structure in 60 male rats that swam for one hr periods daily or intermittently (twice weekly) for a 10 wk period After sacrifice of these animals and unexercised controls organ weights were obtained Line sampling, planimetry, and quantitative histologic methods were used Both exercise groups had body weights that were 10% below the control levels In both intermittent and daily exercised groups heart weights were 17 and 20%, respectively greater than the control levels The increased heart weight was due

to an increased number of myocardial fibers although cellular compositions of control and exercised hearts were similar Decreased kidney weights in the exercised animals were associated with a decreased number of glomeruli The cytoplasmic mass of individual adrenal cortical cells was also increased in the exercised groups, whereas the number of adrenal cortical cells present was less than in the controls Cellular compositions of the liver kidney, adrenals and spleen of exercised animals were similar to those reported in animals residing in a hypoxic environment However, cellular changes of hearts of exercised animals were different from those reported in hypoxic animals suggesting the influence of factors other than relative hypoxia

A69-80715

IMPAIRED ORTHOSTATIC TOLERANCE AFTER BED REST IN PATIENTS WITH MYOCARDIAL INFARCTION

Khaja Fareeduddin and Walter H Abelman (Harvard Med School, Dept of Med, Boston and Boston City Hosp Second and Fourth (Harvard) Med Serv and Thorndike Mem Lab, Mass)

New England Journal of Medicine, vol 280 Feb 13 1969, p 345-350 20 refs

NASA Grant NsG 595 Grants PHS HE 10539 PHS HE 5244, and PHS FR-76

In the presence of coronary atherosclerosis, systemic hypotension may result in acute ischemic damage to the myocardium In 22 patients convalescing from acute myocardial infarction, orthostatic tolerance was studied by means of measurements of heart rate and blood pressure after bed rest Tests were repeated after full mobilization in 16 patients In five of 10 patients treated with strict bed rest for nine to 24 days systemic blood pressure transiently fell by more than 38 mm of mercury during 15 min of passive upright tilt to 70°, a response abolished after full ambulation This response was also seen in three of eight patients assuming a passive, sitting posture after strict bed rest It was usually asymptomatic The response was not observed in eight patients treated with modified bed rest Strict bed rest in the treatment of acute myocardial infarction may result in cardiovascular deconditioning Initial mobilization of such patients should be gradual and under careful supervision

A69-80716

EFFECT OF CARBON MONOXIDE ON THE WHOLE FIBRINOLYTIC ACTIVITY

Osamah Amin El-Attar and D M Sairo (Assiout U Fac of Med U A R)

Industrial Medicine and Surgery, vol 37, Oct 1968 p 774-777 17 refs

A study of whole fibrinolytic activity among 21 cases of acute carbon monoxide poisoning and 28 cases of repeated carbon monoxide exposure and 15 control group was conducted Rise of whole fibrinolytic activity among acute monoxide was significant Moderate rise was noticed among repeated carbon monoxide group more than among control group The results suggested that attention ought to be paid to estimate the whole fibrinolytic activity periodically among workers exposed to carbon monoxide When the fibrinolytic activity is highly elevated attention should be paid to lower the MAC value of carbon monoxide in the working environment and medical treatment has to be given to the applicant

A69-80717

STUDIES ON THE INTESTINAL FLORA 1 THE BACTERIAL FLORA OF THE GASTROINTESTINAL TRACT IN HEALTHY AND ACHLORHYDRIC PERSONS

A69-80718

B S Drasar (St Mary's Hosp Med School, Wright-Fleming Inst London, Great Britain) M Shiner and G M McLeod (Med Res Council, Gastroenterol Unit, Central Middlesex Hosp London Great Britain)

Gastroenterology, vol 56 Jan 1969 p 71-79 22 refs
Med Res Council supported research

The types and distribution of bacteria in the saliva the stomach contents, small intestinal juice, and feces of normal people and in the stomach contents and small intestinal juice of patients with gastric achlorhydria were examined. The most numerous organisms grown from the intestine were nonsporing anaerobic bacteria; this dominance was especially marked in feces where other organisms contributed less than 0.1% of the total bacterial count. Within broad limits the mixture of salivary and food organisms passing into the stomach of all subjects studied was the same. The stomach was sterile in most fasting normal people; only in patients with gastric achlorhydria was any bacterial colonization of the stomach seen. Gastric acidity apparently influenced the passage of bacteria from the mouth into the intestine. In the people studied who had gastric acid the upper small intestine was virtually free from bacteria except after a meal.

A69-80718

CONSERVATION OF SODIUM, CHLORIDE, AND WATER BY THE HUMAN COLON

Ghislain J Devroede (Minn U Mayo Graduate School of Med Rochester) and Sidney F Phillips (Mayo Clin and Mayo Found, Gastroenterol Unit, Rochester Minn)

Gastroenterology, vol 56 Jan 1969 p 101-109 31 refs
Grant NIH AM-6908

The transport of electrolytes by the human colon was studied by perfusing the entire colon with isotonic solutions containing different concentrations of sodium, chloride, potassium, and bicarbonate. Absorption of sodium and chloride against large concentration gradients contrasted with transport characteristics of the small intestine, emphasizing the normal conserving function of the colon for these electrolytes. Potassium and bicarbonate are secreted by the colon; chloride in the lumen facilitates the secretion of bicarbonate. However, both potassium and bicarbonate are absorbed when sufficiently large gradients of concentration between colon and blood are achieved. Although water is absorbed effectively by the colon, the process is probably passive after osmotic gradients are produced by absorption of sodium. Relationships between ionic transport are such that net absorption of chloride balances the flux of sodium into the circulation, the reversed flux of sodium into the colon is accompanied by secretion of bicarbonate.

A69-80719

OCULAR HAZARDS OF TRANSSCLERAL LASER RADIATION. 2. INTRAOCULAR INJURY PRODUCED BY RUBY AND NEODYMIUM LASERS

Richard S Smith and Marvin N Stein (Armed Forces Inst of Pathol, Washington D C)

American Journal of Ophthalmology, vol 67 Jan 1969 p 100-110 14 refs

Contracts DA-49-193-MD2680 and DA-3A-01401B71P

The ocular effects of transscleral radiation by non-Q-switched ruby and neodymium lasers were studied in living rabbits. In a number of rabbit eyes posterior subcapsular cataracts of a characteristic configuration were produced. Dosage related chorioretinal destruction developed beneath the site of impact accompanied by vitreous coagulation, hemorrhage, and secondary retinal detachment. No contra-coup lesions were observed. Various secondary changes involving the anterior segment occurred following the

initial injury. They included corneal vascularization, retrocorneal membrane formation, hemorrhage, and focal muscle necrosis. The threshold of damage by the neodymium laser in the rabbit was 60 joules/cm², while minimal lesions were seen with the ruby laser at a level of 30 joules/cm². The changes observed following transscleral laser radiation are significant because of the increasing use of high energy laser devices in research laboratories and industry.

A69-80720

FUNGI FROM THE NORMAL OUTER EYE

Louis A Wilson (Miami, U, School of Med, Bascom Palmer Eye Inst, Dept of Ophthalmol, Fla) Donald G Ahearn (Ga State Coll Dept of Biol Atlanta) Danny B Jones and Robert R Sexton
American Journal of Ophthalmology, vol 67 Jan 1969 p 52-56 20 refs

Grants PHS NB 04536-03 and PHS 1 F11 NB-1453-01

Samples from the eyelid margins and conjunctival sacs of both eyes of 158 people with no clinical evidence of ocular disease were cultured twice to determine the incidence and persistence of fungi. Fungi, predominantly yeasts, were obtained from 47 eyes of 35 individuals, 22 women and 13 men. *Candida parapsilosis*, the most common species isolated, occurred in 12 out of 47 eyes. Fungi in the healthy outer eye appeared to depend on random seeding from the environment and to be transient. In two cultures at a one-week interval of samples from all eyes, only three subjects had the same fungus in the same eye. Following alteration of environment of two of these three subjects, a third culture was negative for fungi. The introduction of high numbers of adventitious pathogenic fungi into the eye or in the surrounding region by cosmetics or ophthalmic medications is potentially hazardous.

A69-80721

PRODUCTION OF PHOTONS IN THE BACTERICIDAL EFFECT OF TRANSIENT ELECTRIC ARCS IN AQUEOUS SYSTEMS

L Edebo (Uppsala, U, Inst of Med Microbiol and Inst of Phys Chem Sweden)

Applied Microbiology, vol 17 Jan 1969, p 48-53 13 refs

Grangesbergsbolaget supported research

The radiation in the visible and ultraviolet regions from submerged, transient electrical arcs was measured with a $K_3Fe(C_2O_4)_3$ chemical actinometer and was compared to the bactericidal effect obtained with the same electrical arrangements. Photon production and bactericidal effect were obtained at lower voltages with a smaller electrode separation than a wider one. At higher voltages both increased with wider electrode separations. The voltages at maximal photon production efficiency coincided with those of maximal bactericidal efficiency. However, the same photon radiation produced by different electrical arrangements did not always yield the same bactericidal effect in the small discharge vessel usually employed. In a larger discharge vessel the bactericidal effect was closely correlated with the photon production. The efficiency of photon production by transient arcs was smaller than that of germicidal mercury lamps, particularly with respect to wavelengths of great bactericidal activity. The mechanisms of inactivation and their use for practical disinfection purposes are discussed.

A69-80722

VIRUCIDAL EFFECT OF TRANSIENT ELECTRIC ARCS IN AQUEOUS SYSTEMS

M P Singh, S Hermodsson and L Edebo (Uppsala U Inst of Med Microbiol, Sweden)
Applied Microbiology, vol 17 Jan 1969 p 54-58 15 refs
Grangesbergsbolaget supported research

Bacterial and animal viruses were inactivated by high voltage electrical discharges in water. The sensitivity of phages to the immediate component of this effect was correlated to the sensitivity to ultraviolet radiation. Transient electrical arcs in weak electrolytes also generated chemical compounds which were virucidal against phages T3, T5, and OX174 but were only slightly virucidal against phages T2 and T4.

A69-80723

INFLUENCE OF THE CONDUCTIVITY OF THE DISCHARGE LIQUID ON THE MICROBICIDAL EFFECT OF TRANSIENT ELECTRIC ARCS IN AQUEOUS SYSTEMS

L Edebo, T Holme and I Selin (Uppsala, U Inst of Med Microbiol, Karolinska Inst Dept of Bacteriol, and Roy Inst of Technol High Voltage Lab, Stockholm Sweden)

Applied Microbiology, vol 17, Jan 1969 p 59-62 7 refs
Grangesbergsbolaget and Swed Council for Appl Res supported research

The microbicidal effect of electrical discharges on microorganisms suspended in the discharge liquid was reduced when the liquid contained high concentrations of inorganic salts (conductivity $K \geq 5$ mmho/cm). A higher discharge voltage and a smaller distance between the submerged electrodes counteracted this reduction. The decrease in the microbicidal effect was accompanied by a change in the electrical current and by a decreased yield of microbicidal photons from the electric discharge.

A69-80724

PROCEDURE FOR EVALUATING THE EFFECTS OF 2,450-MEGAHERTZ MICROWAVES UPON STREPTOCOCCUS FAECALIS AND SACCCHAROMYCES CEREVISIAE

R V Lechowich, L R Beuchat, K I Fox and F H Webster (Mich State U Dept of Food Sci, East Lansing)

Applied Microbiology, vol 17 Jan 1969 p 106-110 8 refs
Armour and Co supported research

Modifications of a commercial 2,450-megahertz microwave oven were made so that six ml of microbial suspension could be exposed to the microwave field for various periods of time. The microorganisms were contained in the central tube of a modified Liebig condenser positioned in the approximate geometric center of the oven cavity. Kerosene at -25°C was circulated through the jacket of the condenser during microwave exposure permitting microwaves to reach the microbial suspension. Flow rates of the kerosene were varied to permit the temperature of the suspension to range from 25 to 55°C during microwave exposure. Conductive heating experiments using similar temperatures were also conducted. A thermocouple-relay system was employed to measure the suspension temperature immediately after the magnetron shutoff. Continuous application of microwaves to suspensions of 10^8 to 10^9 *Streptococcus faecalis* or *Saccharomyces cerevisiae* per ml appeared to produce no lethal effects other than those produced by heat. Respiration rates of microwave-exposed *S. cerevisiae* were directly related to decreases in viable count produced by increased microwave exposure times.

A69-80725

EFFECTS OF GROWTH AND TOXIN PRODUCTION OF EXPOSURE OF SPORES OF CLOSTRIDIUM BOTULINUM TYPE F TO SUBLETHAL DOSES OF GAMMA IRRADIATION

N J Williams-Walls (Ga Inst of Technol, Eng Expt Sta and School of Appl Biol Atlanta)

Applied Microbiology, vol 17 Jan 1969 p 128-134 27 refs
Contract AEC AT-(40-1)-3347 and Grant GIT E-600-601

Spores of the Langeland strain of *Clostridium botulinum* type F were grown at 30 or 10°C after exposure to 0.0 , 0.1 or 0.2 megarad of cesium-137 gamma irradiation. When incubated at 30°C cultures irradiated at the 0.2 -megarad level reached the stationary growth phase 15 hr earlier than the 0.0 or 0.1 megarad-irradiated cultures. This was not the result of earlier or more frequent germination of the irradiated spores; the formation of larger individual cells, filament formation, or cell clumping. It appeared to result from elimination of a lytic phenomenon noted in 0.0 and 0.1 megarad-irradiated cultures after 26 and 29 hr of incubation respectively, which was followed by a second exponential-growth response five hr later in these cultures. The time of toxin appearance in culture supernatant fractions was independent of prior irradiation treatment and occurred after 36 hr of incubation. Toxin release was essentially logarithmic until maximal titers were reached and maximal toxin titers were higher in irradiated than in unirradiated cultures. The higher toxin level was sustained over a period of 23 days at 30°C . Toxin produced in the 30°C cultures could not be trypsin-activated. An incubation temperature of 10°C resulted in no outgrowth of spores subjected to 0.2 megarad of irradiation although spore germination did occur. At 10°C outgrowth of the 0.1 -megarad culture were faster with slightly higher quantities of a more stable toxin than was seen in the unirradiated control. At 10°C trypsinization was necessary to demonstrate the toxin present in the cultures.

A69-80726

GROWTH OF CHLORELLA SOROKINIANA AT HYPERBARIC OXYGEN PRESSURES

B Richardson, Fred W Wagner and B E Welch (USAF School of Aerospace Med, Aerospace Med Div (AFSC), Environ Systems Branch, Brooks AFB Tex)

Applied Microbiology, vol 17, Jan 1969 p 135-138 14 refs

The growth rate of *Chlorella sorokiniana* decreased in a linear fashion as the partial pressure of oxygen was increased from 711 to 1478 mm of Hg. Under two atmospheres of oxygen pressure, growth ceased after 10 to 12 hr. This cessation of growth was not due to any permanent injury as growth resumed when oxygen partial pressure was reduced to ambient levels. The inhibition occurred under both autotrophic and heterotrophic growth conditions and was not accompanied by an increase in cell size. The results indicated that the tolerance of *Chlorella* cells to elevated oxygen pressures was not an absolute immunity and that inhibition of growth at very high oxygen pressures cannot be accounted for by an inhibition of photosynthesis alone.

A69-80727

OXYGEN-TOLERANT STRAIN OF CHLORELLA SOROKINIANA

Fred W Wagner and B E Welch (USAF School of Aerospace Med, Aerospace Med Div (AFSC), Environ Systems Branch, Brooks AFB, Tex)

Applied Microbiology, vol 17, Jan 1969, p 139-144 18 refs

An oxygen-tolerant strain (OTS) of *Chlorella sorokiniana* was isolated by growing and continuously subculturing the oxygen-sensitive strain (OSS) in growth medium bubbled continuously with 95% O_2 - 5% CO_2 . Under these conditions, six to eight hr were required before the OSS began to grow. The growth rates of the OTS and the OSS were the same when grown in an

atmosphere of air-5% CO₂ and the growth rate of the OTS was the same when aerated with 95% O₂-5% CO₂ and air-5% CO₂. The adaptive process was irreversible since serial transfers on the OTS grown with air-5% CO₂ did not alter the ability of the OTS to grow with 95% O₂-5% CO₂ inasmuch as photosynthesis in the OTS and the OSS was inhibited to a similar extent by oxygen and the adaptive process occurred heterotrophically in the absence of photosynthesis, it was concluded that the adaptive process was independent of photosynthesis. Morphological differences between the OTS and the OSS are presented and discussed with respect to the adaptive process.

A69-80728

VACUUM PROBE NEW APPROACH TO THE MICROBIOLOGICAL SAMPLING OF SURFACES

W J Whitfield, J W Beakley, V L Dugan, L W Hughes M E Morris and J J McDade (N Mex, U and Sandia Labs, Albuquerque)

Applied Microbiology, vol 17 Jan 1969 p 164-168 15 refs
NASA Contract R-09-010-040

The need for a device to sample large areas that are lightly contaminated with microorganisms motivated the development of the vacuum probe. The intended use of the instrument is to sample clean surfaces in laminar flow clean rooms but the device could be used for sampling surfaces in other clean environments. Such a device was designed fabricated and tested at Sandia Laboratories, Albuquerque, N M. In these tests the vacuum probe removed a mean of 89% and assayed a mean of 67% of bacterial spores approximately one μ m in length settled on smooth surfaces which were free from viscous films.

A69-80729

PROTEIN QUALITY OF THE BACTERIUM HYDROGENOMONAS EUTROPHA

Doris H Calloway and Adarsh M Kumar (Calif, U, Dept of Nutr Sci Berkeley)

Applied Microbiology, vol 17, Jan 1969, p 176-178 8 refs
Intern Congr of Food Sci and Technol, Warsaw, 1966
NASA Contract NASA-100(03) and NASA Grant NGR-05-003-089

Hydrogenomonas eutropha cells harvested from semicontinuous autotrophic culture and washed free of substrate contain about 13% of nitrogen on a dry-solids basis. Biological value and digestibility of the bacterial nitrogen were determined in the rat by use of an abbreviated Mitchell-Thomas nitrogen balance technique and casein as the standard protein. Casein nitrogen was 99% digestible, and that of both whole boiled and sonically ruptured bacterial cells was 93%. Biological value of casein and the bacterial preparation was uniformly 77%. Amino acid composition of the bacteria as in the case of casein, indicates a first limitation of sulfur-containing amino acids. These compositional features suggest that *H. eutropha* may be potentially valuable as a protein supplement in animal feeds.

A69-80730

THE EFFECT OF ADRENAL DEMEDULLATION ON THE BLOOD SUGAR LEVEL OF RATS SUBJECTED TO LONG-TERM COLD STRESS

Alison M Jarratt and N W Nowell (Hull, U Dept of Zool, Great Britain)

Canadian Journal of Physiology and Pharmacology, vol 47, Jan 1969, p 1-6 26 refs

Blood sugar levels and adrenal weights (where possible) were recorded after a 24-hr fast in normal intact, adrenal-demedullated and adrenalectomized rats kept at 4° C for up to 130 days.

These were compared with data from control rats kept at 20° C. Hypoglycemia (relative to the control value) prevailed in both normal intact and, more profoundly in adrenal-demedullated rats during the first 24 hr of chilling but no deaths occurred. Adrenalectomized rats whose blood sugar level at 21° C was subnormal at 4° C soon showed extreme hypoglycemia and died. More prolonged chilling in normal intact rats resulted in hyperglycemia which lasted until after the 25th day. In contrast in chilled adrenal-demedullated animals the blood sugar remained at the control level throughout this period. At the 50th day the blood sugar of normal intact animals fell to the control value and remained so thereafter. A similar fall in adrenal-demedullated rats resulted in hypoglycemia but a rise to control values was recorded from the 75th day. Adrenocortical hypertrophy was generally more extensive in the demedullated animals than in the normal intact animals but was absent in both groups by the 130th day. It was concluded that the adrenal medulla besides helping to provide extra blood glucose during exposure to short-term chilling, is also responsible for the sustained hyperglycemia of rats chilled for prolonged periods and thus assists in their acclimation to long-term cold stress.

A69-80731

PROLONGATION OF CERTAIN EFFECTS OF AMPHETAMINE BY CHLORPROMAZINE

L Borella, F Herr, and A Wojdan (Ayerst Labs, Montreal, Quebec, Canada)

Canadian Journal of Physiology and Pharmacology, vol 47, Jan 1969 p 7-13 15 refs

The effect of chlorpromazine was studied on the hypermotility and hyperthermia induced by amphetamine in rats and correlates the effects observed with brain levels of the stimulant. Chlorpromazine antagonized these effects of amphetamine initially and there was a dose-effect relationship in this antagonism. On the other hand a combination of 7.2 mg/kg chlorpromazine and 8.5 mg/kg dl-amphetamine caused a delayed excitation and hyperthermia. The excitatory effect of this dose of amphetamine was prolonged by doses of chlorpromazine ranging from 1.9 to 7.2 mg/kg. Chlorpromazine modified the disposition of amphetamine as evidenced by considerably higher and more sustained brain levels of the stimulant in rats which received the combined treatment. The significance of these findings and the similarity of the interaction of chlorpromazine and imipramine with amphetamine are discussed.

A69-80732

THE EFFECT OF DECREASED FEEDING FREQUENCY ON BODY COMPOSITION IN MATURE AND IMMATURE MALE AND FEMALE RATS

Janet M Wardlaw, Donna J Hennyey, and Ruth H Clarke (Toronto, U Fac of Food Sci Ontario, Canada)

Canadian Journal of Physiology and Pharmacology, vol 47, Jan 1969 p 47-52 25 refs
Grant NRC A-2401

Ninety-day-old male and female rats of the Wistar strain were force-fed a liquidified diet twice daily for a two-wk experimental period. The amounts fed corresponded to *ad libitum* intakes of similar groups of animals fed the diet in the dry state. The animals were adjusted to the feeding technique for one wk prior to the experimental period. At the end of the experimental period the carcasses of the force-fed animals and the *ad libitum* control groups were analyzed for fat, nitrogen, and moisture content. The frequency of feeding had no significant effect on percentage carcass fat, but lessened frequency of feeding was associated with a decrease in percentage carcass protein ($N \times 6.25$) which was of slight significance. Subsequently, 35-day-old animals were treated

similarly In the younger animals the method of feeding had a significant effect on carcass fat, with an increase in fat content in the force-fed animals which was apparent in the males but was not of significance in the females The increased fat deposition in the immature male animals was accompanied by a decreased weight gain A significant decrease in percentage carcass protein was observed in the immature force-fed animals

A69-80733

THE EFFECT OF RADIOPROTECTIVE AGENTS ON ERYTHROPOIESIS IN IRRADIATED MICE

P V Vittorio, E A Watkins, and S Dziubalo-Blehm (Biol and Radiation Estab, Defence Chem, Ottawa, Canada)

Canadian Journal of Physiology and Pharmacology, vol 47, Jan 1969, p 65-71 29 refs

The radioiron test (ie ^{59}Fe uptake by blood, spleen and liver) was used to evaluate the degree of protection (one day after irradiation) and effect on recovery (seven days after irradiation) of the erythropoietic system when radioprotective agents were administered In blood, spleen and liver, AET administered prior to irradiation caused a decreased radiation effect on ^{59}Fe uptake one day after irradiation and a subsequent parallel return with the irradiated nonprotected group to the control value This indicated that the early recovery by the protected group was probably due to less initial damage The amount of protection afforded the erythropoietic system by sulfhydryl agents was in good agreement with irradiation survival studies and indicated that a good sulfhydryl radioprotective agent provided good protection and a poor sulfhydryl radioprotective agent provided poor protection to the erythropoietic system Thus the radioiron test is a good method to evaluate sulfhydryl compounds as radioprotective agents Erdotoxin demonstrated poor correlation between the early erythropoietic effect and survival in irradiated mice, but recovery studies (seven days) showed much better agreement The biological amine serotonin produced poorer initial protection to the erythropoietic system and slower recovery than AET even though the dose reduction factor of each was comparable Serotonin must, therefore protect other systems which then contribute to the eventual recovery of the erythropoietic system and survival

A69-80734

MITOCHONDRIA FROM BROWN FAT ENZYMES AND RESPIRATORY CHAIN PHOSPHORYLATION DURING THE PRE- AND POSTNATAL DEVELOPMENT OF THE INTERSCAPULAR FAT BODY OF THE GUINEA PIG [MITOCHONDRIEN AUS BRAUNEM FETTGEWEBE ENZYME UND ATMUNGSKETTENPHOSPHORYLIERUNG WAHREND DER PRA- UND POSTNATALEN ENTWICKLUNG DES INTERSCAPULAREN FETTKORPERS DES MEERSCHWEINCHENS]

Johannes Rafael, Dieter Klaas and Hans-Jurgen Hohorst (Marburg/Lahn, U Physiol-Chem Inst, West Germany)

Hoppe-Seyler's Zeitschrift für Physiologische Chemie, vol 349, Dec 1968, p 1711-1724 37 refs In German

Studies are reported on the mitochondria from the interscapular adipose tissue of the guinea pig during pre- and postnatal development, and after rearing in warm and cold conditions The animals were reared at 20 to 22° C or 5 to 8° C Over a period extending from three wk before birth to three wk after birth the mitochondria were analyzed for the following concentrations of cytochromes and flavoproteins, the activities of seven mitochondrial enzymes, respiratory control and P/O ratio with six respiratory substrates Both electron microscope studies and the levels of cytochromes and enzymes indicate that independent of the rearing

conditions, the mitochondria of the intrascapular fat body are largely uniform over the studied time period The number of mitochondria, however, decreases to one-fifth the value at birth when the animals are reared under warm conditions Rearing in the cold prevents this decrease In warm-reared animals, the values for respiratory control and the P/O ratios of the isolated mitochondria pass through a minimum at the time of birth and two to three days afterwards In cold-reared animals, respiratory control and oxidative phosphorylation remained at the low level found at birth The reported findings for isolated mitochondria during the perinatal development of the brown fat show some correlation with the changes in the function of this tissue This is discussed with reference to heat production

A69-80735

INCREASE OF THE CELL-FREE PROTEIN SYNTHESIS OF STARVED RATS AFTER TREATMENT WITH PHENOBARBITAL [STEIGERUNG DER ZEILFREIEN PROTEINSYNTHESE DURCH PHENOBARBITALBEHANDLUNG HUNGERNDER RATTEN]

Helmut Greim (Tubingen, U, Inst für Toxikol, West Germany)

Hoppe-Seyler's Zeitschrift für Physiologische Chemie, vol 349, Dec 1968, p 1774-1776 10 refs In German

After pretreatment of rats with phenobarbital the capacity of live microsomes to incorporate [^{14}C]-phenylalanine *in vitro*, using postmicrosomal supernatant as an enzyme source was increased by 40% The incorporation of the amino acid by microsomes of starved control rats was decreased about 25% relative to non-starved controls Pretreatment of starved rats with phenobarbital caused an increase in the [^{14}C]-phenylalanine incorporation, which was 40% higher than non-starved controls, but compared with starved controls was increased 100% The increase incorporating activity after pretreatment with phenobarbital seems to be due more to an increased content of endogenous microsomal mRNA than an increase in ribosomal binding capacity

A69-80736

SEAT-BELT INJURY INJURY OF THE ABDOMINAL AORTA

Dudley K Campbell and Raymond F Austin (Naval Hosp, Dept of Radiol, St Albans, N Y)

Radiology, vol 92, Jan 1969 p 123-124 11 refs

In an unusual injury following seat-belt trauma a dissection of the aortic wall apparently masked by massive abdominal trauma An accompanying bruit was due to strictures of the superior mesenteric artery A review of the literature reveals this to be the first case report of abdominal aortic injury due to the lap-type seat belt in an automobile accident Aortography revealed two intimal flaps of the abdominal aorta, one intimal flap of the right common iliac artery, and strictures of the superior mesenteric artery all of which were confirmed at surgery The patient also sustained a wedge fracture of L-1 laceration of the inferior vena cava laceration of the small bowel and its mesenteric arterial supply, crushed and devitalized hepatic flexure and sigmoid colon, and a third-degree burn of the anterior abdominal wall

A69-80737

ANOMALOUS EFFECTS OF DIMETHYL SULFOXIDE ON THE RESPONSE OF THE MOUSE LENS AND CORNEA TO X-IRRADIATION "PROTECTION" OF LENS AND "SENSITIZATION" OF CORNEA

Ronald F Hagemann Titus C Evans and Edgar F Riley (Iowa, U, Coll of Med Radiation Res Lab, Iowa City)

Radiology, vol 92 Jan 1969, p 156-158 23 refs

AEC and Am Cancer Soc supported research

Dimethyl sulfoxide, applied topically to the eyes of mice eight min prior to head irradiation with 1,000 r, prevented complete cataract formation. Although slight lenticular changes were observed in the treated, irradiated animals they did not progress to complete opacification as in the untreated animals. In the same eyes in which the lens was apparently protected, it seemed that the cornea was made more sensitive to radiation damage.

A69-80738

THE USE OF ACTIVITY INDUCED IN TISSUE TO DETERMINE DOSE FROM PARTICULATE RADIATIONS

E. E. Stickley and Nabil Azzam (Va. Med. Coll., Dept. of Radiol., Richmond)

Radiology, vol 92, Jan 1969, p 168

Radiol. Soc. of North Am., 54th Sci. Assembly and Ann. Meeting, Chicago, Dec 1-6, 1968

A procedure for the use of activity induced in tissue to determine dose from particulate radiations was presented. Mice were bombarded with protons at 300 and 600 MeV, and whole body counting of the animals was done. Only carbon-11 activity was determined. This procedure was used successfully to select uniform exposure sites in the proton beam as well as to set exposure times and to check the doses received.

A69-80739

REGIONAL PULMONARY BLOOD FLOW IN SITTING AND SUPINE MAN DURING AND AFTER ACUTE HYPOXIA

Arthur Dawson (Scripps Clin. and Res. Found., Div. of Cardiopulmonary Diseases, La Jolla, Calif.)

Journal of Clinical Investigation, vol 48, Feb 1969, p 301-310, 19 refs

Grant PHS HE 10009

Regional pulmonary blood flow was measured by external counting of intravenously injected ^{133}Xe during 20 min of breathing 14.2% oxygen and during 20 min of recovery from hypoxia. Sixteen normal human volunteers were studied, nine sitting and seven supine. During hypoxia there was a slight but significant increase in relative perfusion of the upper portions of the lungs in both the sitting and supine subjects. During recovery from hypoxia, blood flow distribution differed significantly from the control. The erect subjects showed increased relative perfusion of the lung bases and the supine subjects showed increased relative perfusion of the upper zones. Comparison of the distribution of inhaled and intravenously injected isotope showed that in the sitting subjects the altered distribution during hypoxia tended to make alveolar oxygen tension more uniform. In the supine subjects, however, the shift in blood flow increased the perfusion of the regions with the lowest ventilation/perfusion, tending to accentuate uneven alveolar oxygen tension. The altered distribution of pulmonary blood flow during recovery from hypoxia suggests the occurrence of posthypoxic vasodilation. Failure to consider this possibility may lead to erroneous interpretation of pulmonary hemodynamic measurements made after the inspired oxygen concentration has been changed.

A69-80740

GROWTH HORMONE SECRETION DURING NOCTURNAL SLEEP IN NORMAL SUBJECTS

Yutaka Honda, Kiyohisa Takahashi, Saburo Takahashi, Kazuo Azumi, Minoru Irie, Maki Sakuma, Toshio Tsushima, and Kazuo Shizume (Tokyo, U. Fac. of Med. Japan)

Journal of Clinical Endocrinology and Metabolism, vol 29, Jan 1969, p 20-29, 13 refs

Japan EEG Soc., 16th Ann. Meeting, Nagoya, Oct 18, 1967

Electroencephalogram (EEG), pulse rate, respiration and eye movement were polygraphically recorded throughout the night in 10 normal adult male subjects. Blood was collected every 20 min throughout the night by means of an indwelling venous catheter without disturbing the natural course of sleep. Human growth hormone (HGH) and blood sugar were measured in these plasma samples. Depth of sleep was classified into five stages by EEG. A marked elevation of plasma HGH was constantly observed coincident with the onset of sleep. Following the initial large HGH peak, additional peaks of HGH, with a decrease in the size of subsequent peaks, were observed. Shifting the time of the onset of sleep by three hr before or after the usual bedtime did not change the elevation of plasma HGH coincident with the onset of sleep. When a state of full wakefulness was maintained at night, plasma HGH did not rise. The secretion of plasma HGH was inhibited during paradoxical sleep. It is concluded that nocturnal sleep is a potent stimulator for the secretion of growth hormone, and that the secretion pattern of HGH is closely correlated with the depth and the course of sleep. A hypothesis that neocortical activation inhibits the secretion of HGH, and slow wave sleep induces the secretion of growth hormone releasing factor in the hypothalamus was proposed.

A69-80741

EFFECTS OF FASTING AND REFEEDING. I. STUDIES ON SODIUM, POTASSIUM AND WATER EXCRETION ON A CONSTANT ELECTROLYTE AND FLUID INTAKE

Egils Vevebrants and Ronald A. Arky (Boston City Hosp., Second and Fourth (Harvard) Med. Serv., Thorndike Mem. Lab. and Harvard Med. School, Dept. of Med., Boston, Mass.)

Journal of Clinical Endocrinology and Metabolism, vol 29, Jan 1969, p 55-62, 37 refs

Grants PHS AM-11176, PHS 2-A-5060, and PHS FR-76

Seventeen subjects were maintained on a constant electrolyte and fluid intake during periods of equilibration, starvation and refeeding. During three days of fasting, a mean daily weight loss of 800 g was accompanied by progressive natriuresis and kaliuresis without increase in urine volume. The net amount of sodium excreted as a consequence of fasting was independent of the amount of sodium supplemented. Carbohydrate refeeding induces very rapid antidiuresis of sodium and potassium. Protein has a delayed action, while fat refeeding aggravates the negative sodium balance. The sodium retaining action of carbohydrate requires a pre-existing metabolic setting induced by starvation. Bicarbonate supplementation during fasting does not alter the pattern of sodium excretion. The data suggest that sodium retaining action of carbohydrate after brief starvation is not secondary to aldosterone, glucocorticosteroids or changes in catecholamine levels.

A69-80742

THYROCALCITONIN ITS ROLE IN CALCIUM HOMEOSTASIS

Menelaos A. Aliapoulos, Daniel S. Bernstein (Peter Bent Brigham Hosp., Boston, Mass.), and Marios C. Balodimos (Elliott P. Joslin Res. Lab., Boston, Mass.)

Archives of Internal Medicine, vol 123, Jan 1969, p 88-94, 79 refs

Grants PHS AM11572-01 and PHS AM03967-09, NIH and Harvard School of Public Health supported research

The role of thyrocalcitonin in calcium metabolism is discussed and pertinent literature is reviewed. The effect of thyrocalcitonin in bone resorption is elucidated and it is suggested that the hormone may be useful in space travel. A large bibliography is given.

A69-80743

CHANGES IN THE ACETYLCHOLINE CONCENTRATION IN THE BRAIN TISSUES OF RATS AFTER A SINGLE EXPOSURE TO VIBRATIONAL STRESS [ZMIANY STEZENIA ACETYLOCHOLINY W TKANCE MOZGOWEJ SZCZUROW POWSTAJACE POD WPLYWEM JEDNORAZOWEJ EKSPOZYCJI NA DZIAANIE DRGAN MECHANICZNYCH]

Zofia Brzezińska

Acta Physiologica Polonica, vol 19, Sep–Oct 1968 p 683–693
25 refs In Polish

Rats were exposed to vibrations and noise, or noise alone, for 1, 2, 4, 6, 8, and 10 hr. The concentration of acetylcholine, the acetylcholinesterase activity, and ability of the brain tissues to synthesize acetylcholine were studied in fresh brain tissues. The concentration of acetylcholine in the brain tissues increased, attaining its highest values after two hr exposure. In rats exposed to vibration and noise, the increase was 245.2%, and in rats subjected only to the effect of noise 76.0%. Subsequently with the increasing of exposure time from two to 10 hr, the acetylcholine concentration gradually decreased, approaching the level observed in the control animals. Accordingly the acetylcholinesterase activity and ability of the cerebral tissues to synthesize acetylcholine decreased at first, then gradually increased in proportion with lengthening of the exposure time from two to 10 hr.

A69-80744

THE GRADUAL DECREASE IN ACETYLCHOLINE CONCENTRATION INDUCED BY A SINGLE TWO HOURS EXPOSURE TO VIBRATION [PRZEBIEG USTĘPOWANIA ZMIAN STEZENIA ACETYLOCHOLINY WYWOANYCH JEDNORAZOWA, 2-GODZINNA EKSPOZYCJA NA DZIAANIE DRGAN MECHANICZNYCH]

Zofia Brzezińska

Acta Physiologica Polonica, vol 19, Sep–Oct 1968 p 695–702
5 refs In Polish

Studies were conducted on rats exposed to vibrations and noise, or noise only, for two hr. After 2, 4, 6, 8 and ten days, the concentrations of acetylcholine, the acetylcholinesterase activity, and the ability of the brain tissues to synthesize acetylcholine were studied. The concentration of acetylcholine decreased gradually, while the acetylcholinesterase activity and the ability of the brain tissues to synthesize acetylcholine increased, and reached the levels observed in control animals after eight days.

A69-80745

EFFECT OF PHYSICAL TRAINING ON THE WORK CAPACITY AND RESISTANCE IN RATS TO HYPOXIA AND ACCELERATION STRESS [WPLYW TRENINGU FIZYCZNEGO NA ZDOLNOŚĆ WYSIKOWĄ I ODPORNOŚĆ SZCZUROW NA HIPOKSJĘ WYSOKOŚCIOWĄ I PRZYSPIESZENIA]

Jerzy Soysiak

Acta Physiologica Polonica, vol 19, Sep–Oct 1968, p 703–711
19 refs In Polish

The influence of physical training on the performance of physical work of rats and their resistance to hypoxia and acceleration stress was studied in 56 rats. The rats were trained for six wk on a treadmill at a 6° slope, moving at a rate of 30 m/min. The training period during the first four days consisted of five min and gradually increased by five min every fourth day up to 30 min on the 25th day. All further training periods were 30 min. The total running time of each rat during the training program was 16 hr (distance covered 28,800 m), corresponding to 1.133 kg of work at a rate of 0.877 kg/min. Measurements of performance capacity at an altitude of 7,000 m and after a 15 min exposure to +10 G_z

acceleration revealed a threefold increase of the running capacity of the trained rats as compared with untrained controls. Resistance to low atmospheric pressure (145 mm Hg, 12,000 m altitude) and 15 G_z acceleration was not significantly different in trained and untrained rats. Blood lactate, pyruvate and glucose levels in both groups of rats were determined under hypoxic conditions and after exposure to acceleration. The results showed that the training ensured a greater performance capacity in rats under conditions of hypoxia and after an exposure to + G_z. Training did not affect the survival time of the rats under conditions of simulated altitude of 12,000 m or acceleration of + 15 -G_z, indicating a lack of the so-called nonspecific resistance to environmental factors if survival time was taken as an index of resistance.

A69-80746

DECONTAMINATION OF POTABLE WATER CONTAINING ENTEROVIRUSES WITH THE PRODUCTS OF COMMON SALT ELECTROLYSIS [OBEZZARAZHIVANIE PIT'VOI VODY, SODERZHASHCHEI ENTEROVIRUSY, PRODUKTAMI ELEKTROLIZA POVARENNOI SOLI]

E. L. Lovtsevich and L. A. Sergunina (USSR, Acad of Med. Sci., A. N. Sytin Inst. of Gen. and Communal Hyg. and K. D. Pamfilov Acad. of Communal Economy, Moscow)

Gigiena i Sanitariia, no 9, Sep 1968, p 22–27 12 refs In Russian

A study was presented of the dynamics of inactivation with the product of common salt electrolysis, an oxidant, and with gaseous chlorine of the attenuated and virulent strains of poliomyelitis virus, Coxsackie B-3 and A-7 viruses, *Escherichia coli* and *E. coli* phase, present in tap water in equal concentrations. The findings showed that in water with a pH of 7.3 the inactivation proceeded two to three times faster and at lower levels of residual chlorine than in water with a pH of 8.3. The decontaminating effect of the oxidant did not differ to any significant extent from the action of the gaseous chlorine. The inactivation process of the investigated microorganisms was more intense when the water contained some amount of free residual chlorine besides the combined one. In all of the investigated conditions of water decontamination with the oxidant the bacillus was less resistant than the phage and the latter was less resistant than the virus.

A69-80747

EFFECT OF BENZENE VAPORS ON THE FUNCTIONAL ACTIVITY OF THE HYPOPHYSIS, ADRENALS AND OVARIES OF WHITE RATS DURING EXPERIMENTATION [VLIANIE PAROV BENZINA NA FUNKTSIONAL'NUIU DEIATEL'NOST' GIPOFIZA, NADPOCHECHNIKOV I IAICHNIKOV BELYKH KRYSV EKSPERIMENTE]

V. G. Matysiak (Leningrad Sanit.-Hyg. Med. Inst. Dept. of Obstet. and Gynecol., USSR)

Gigiena i Sanitariia, no 9, Sep 1968, p 98–100 In Russian

Female white rats were used to study the effect of chronic poisoning of benzene vapors. Changes in the general state of the animals were observed. At first there was a lowering in the weight gain, while later due to the adaptation to benzene poisoning the animals gained weight but lagged behind the controls. The increase in weight of the rats' adrenals and ovaries during chronic intoxication was attributed to an increase in the glandular structure elements and that of the uterus to plethora. Chronic poisoning produced an intensification of the functional activity of the hypophysis. When its extract was administered to infantile rats a marked gonadotropic reaction was observed. The gonadotropic reaction of infantile rats receiving extracts of hypophysis from benzene poisoned animals was related to the duration of the exposure.

A69-80748

A69-80748

EFFECTS OF PAIRED STIMULATION ON CARDIAC OUTPUT IN DOGS AT REST AND DURING EXERCISE

Arthur L. Bassett and Frederick F. Kao (N. Y., State U., Downstate Med. Center, Dept. of Physiol., Brooklyn)

American Journal of Physiology, vol. 216, Jan. 1969, p. 63-69
31 refs

Grants NIH 5T1-GM-968-02, HRC U-1490, and HRC I-194

The effects of paired ventricular stimulation (PS) were observed in intact chloralosed dogs with active cardiovascular reflexes. PS consistently reversed the fall in resting ventricular dp/dt and cardiac output noted during single ventricular stimulation (SS). However, despite the increased contractility induced by PS, resting cardiac output during PS was usually smaller than that resulting from atrial pacing at the same rate. During exercise, PS increased ventricular contractility over that accompanying the same frequencies of sinus rhythm. In contrast to the resting studies, cardiac output in exercise was the same during PS and sinus rhythm. An explanation is offered for the difference in cardiac output at rest and during exercise.

A69-80749

EFFECT OF LONG-TERM EXERCISE ON SKELETAL MUSCLE LIPID COMPOSITION

Thomas E. Morgan, Floyd A. Short, and Leonard A. Cobb (Wash., U., School of Med., Dept. of Med., Seattle)

American Journal of Physiology, vol. 216, Jan. 1969, p. 82-86
21 refs

The effect of four to six wk unilateral isotonic quadriceps exercise on concentrations of total phospholipid, phosphatidyl choline, cholesterol, and triglyceride was studied in the trained and contralateral untrained vastus lateralis of 10 normal men. Phospholipid, phosphatidyl choline, and triglyceride concentrations were higher in trained resting muscle but cholesterol was lower. In each subject the phosphatidyl choline-to-cholesterol ratio was higher in the trained muscles. Cell fractions prepared from human muscle showed a high phosphatidyl choline-to-cholesterol ratio for mitochondria. The observed changes in phosphatidyl choline and cholesterol were compatible with increased mitochondrial size or number and decreased cell cholesterol. Triglyceride content was variable but was also consistently greater in trained muscle.

A69-80750

ANTIDIURETIC EFFECT OF TRIIODOTHYRONINE IN THE HYPOPHYSECTOMIZED RAT

J. W. Bauman, Jr., R. Manshardt, and G. Levisay (Bur. of Res. in Neurol. and Psychiat., Neuroendocrinol. Sect., Princeton, N. J.)

American Journal of Physiology, vol. 216, Jan. 1969, p. 139-142
12 refs

Triiodothyronine (T_3) has been found to be antidiuretic in hypophysectomized rats. This antidiuretic effect is manifested by increased urine osmolalities following water loading or water deprivation, decreased excretion of a water load, and stabilization of plasma osmolality during water deprivation. The effect appears to be indirect, as treatment for one to two days is ineffective whereas longer term treatment produces the effect. Since ADH has parallel effects, and since the antidiuretic effect of T_3 is not seen in hypophysectomized DI (Brattleboro strain) rats, it is proposed that this effect is most probably mediated by increased circulating ADH. The hypophysectomized DI rat was responsive to ADH, but none of the anterior pituitary hormones tested affected urine osmolality or water-load excretion.

A69-80751

EFFECT OF HYPERBARIC OXYGENATION ON LEFT VENTRICULAR FUNCTION

J. Michael Kioschos, Victor S. Behar, Herbert A. Saltzman, Howard K. Thompson, Nelson E. Myers, Wirt W. Smith, and Henry D. McIntosh (Duke U. Med. Center, Dept. of Med., Durham, N. C.)

American Journal of Physiology, vol. 216, Jan. 1969, p. 161-166
19 refs

Grants PHS HE-07896, PHS HE-5662, PHS HE-5663, PHS H-4807, PHS HTS-5369, and PHS 1-F3-HE-32,887-01. John A. Hartford Found. Inc. and Life Insurance Med. Res. Found. supported research.

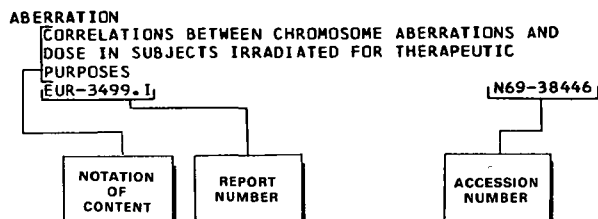
Hyperbaric oxygenation, OHP, results in a decreased cardiac output, reflecting a reduction both of heart rate and stroke volume. To evaluate the mechanisms by which OHP influences cardiac performance, several indices of myocardial contractility were measured in 11 anesthetized dogs at a constant controlled ventricular rate one to three wk after surgical induction of complete atrioventricular block. At 3.6 atmospheres absolute (ATA) of oxygen pressure with an average arterial P_{O_2} of 2372 ± 109 mm Hg, means decreased significantly for stroke volume from 48 ± 5 to 39 ± 6 ml, for stroke work from 92 ± 14 to 74 ± 17 g·m, and for dp/dt from $3,597 \pm 573$ to $3,104 \pm 684$ mm Hg/sec, while isometric contraction time increased from 0.48 ± 0.1 to 0.60 ± 0.1 sec. Filling pressure and afterload (aortic pressure) did not change significantly. These data suggest that the decrease in stroke volume and work, observed during exposure to OHP, is due to a decrease of myocardial contractility.

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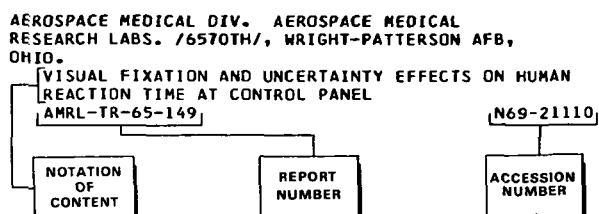
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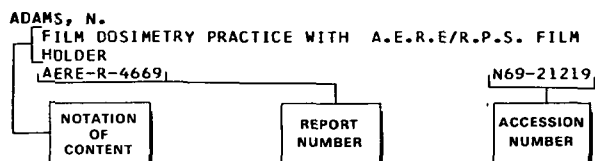
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